NAVSHIPS 92786A UNCLASSIFIED

# TECHNICAL MANUAL

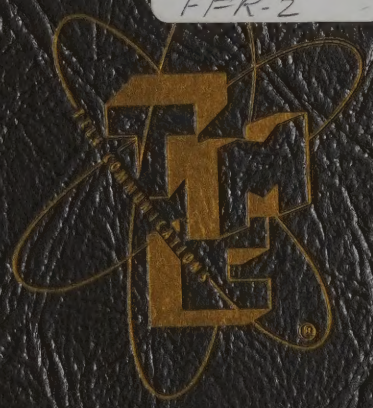
*for*

# RADIO RECEIVING SET

# AN/FRR-49(V)

TMC TN-5010
plug-ins -5011
-5012
-5014

Rec. TN-5007
FFR-2 FFR-3



THE TECHNICAL MATERIEL CORP.
MAMARONECK, N. Y. OTTAWA, ONTARIO

BUREAU OF SHIPS DEPARTMENT OF THE NAVY

NAVSHIPS 92786A

UNCLASSIFIED

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# RADIO RECEIVING SET

# AN/FRR-49(V)

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N. Y. OTTAWA, ONTARIO

BUREAU OF SHIPS DEPARTMENT OF THE NAVY

Approved 15 October 1956

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# CHART OF NOMENCLATURE VS COMMERCIAL DESCRIPTION

| NOMENCLATURE | NOUN | T.M.C. MODEL NUMBER |
|---|---|---|
| AN/FRR-49(V)<br><br>AN/FRR-502<br>(see note) | Equipment, Receiver Set, Radio Consisting of: Receiver Subassembly R5007 and one or more of the TN's and if required CY5045A in any combination. | |
| R-5007/FRR-502 | Receiver Subassembly | FFR-2 |
| TN-5010/FRR-502 | Tuner, R.F. (2-4 Mcs.) | FFRD-5 |
| TN-5011/FRR-502 | Tuner, R.F. (4-8 Mcs.) | FFRD-6 |
| TN-5012/FRR-502 | Tuner, R.F. (8-16 Mcs.) | FFRD-7 |
| TN-5014/FRR-502 | Tuner, R.F. (16-32 Mcs.) | FFRD-8 |
| TN-274/FRR-502 | Tuner, R.F. (50-100 Kcs.) | FFRD-1 |
| TN-275/FRR-502 | Tuner, R.F. (100-200 Kcs.) | FFRD-2 |
| TN-276/FRR-502 | Tuner, R.F. (200-400 Kcs.) | FFRD-3 |
| TN-277/FRR-502 | Tuner, R.F. (500 Kcs.) | FFRD-3M |
| CY-5045/FRR-502 | Cabinet, Electrical Equipment | FFRDP |
| CY-5045A/FRR-502 | Cabinet, Electrical Equipment | FFRDP-H |

NOTE: Receiver Set, Radio AN/FRR-502 is a specific system consisting of the following:

1 each R5007/FRR-502
1 each TN5010/FRR-502
1 each TN5011/FRR-502
1 each TN5012/FRR-502
1 each CY5045/FRR-502

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Figure 1-1. Communication Receiver, Model FFR

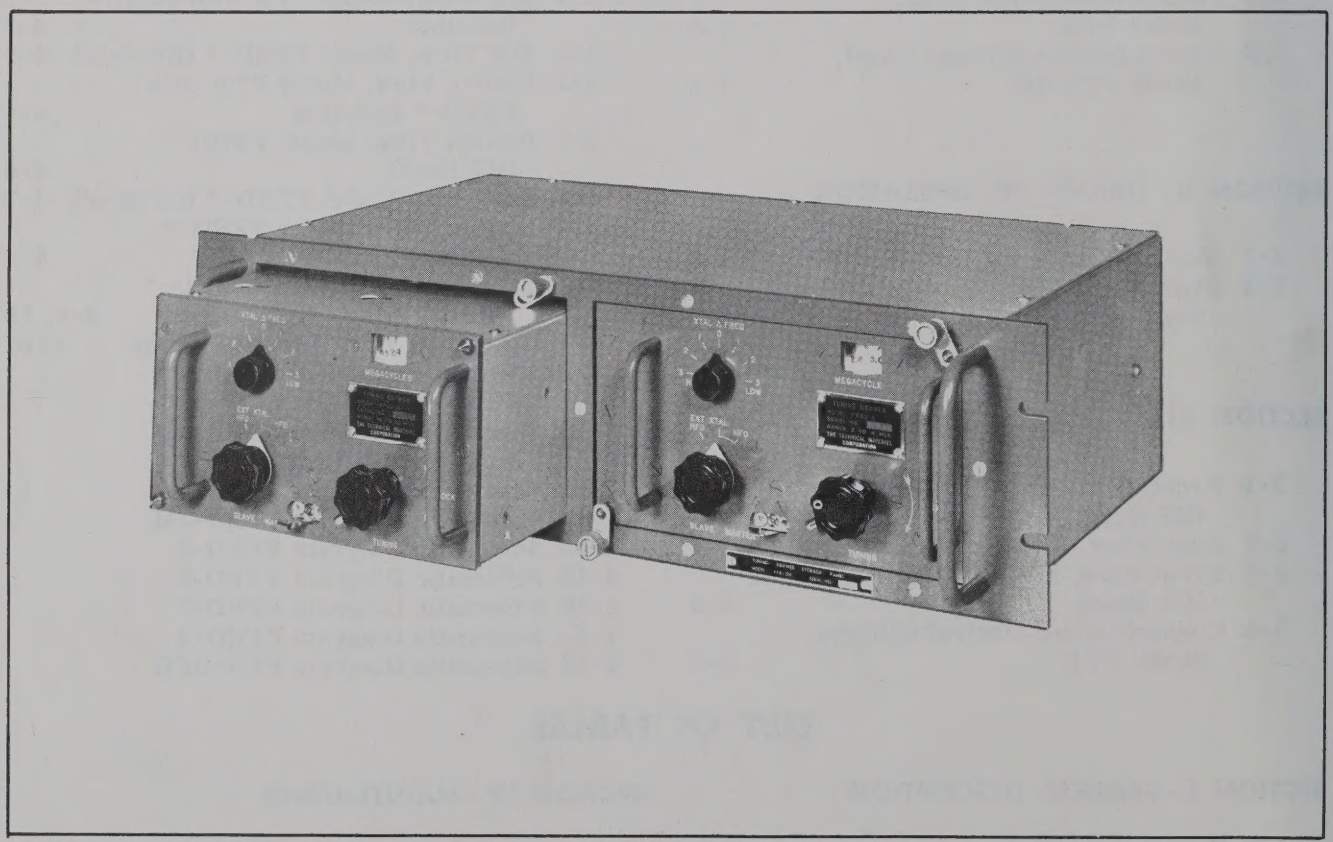



Figure 1-2. Tuning Drawer Storage Panel, Model FFR-DP

# SECTION I
# GENERAL DESCRIPTION

## 1. PURPOSE AN BASIC PRINCIPLES

The Model FFR Communication Receiver has been designed to fulfill the long existing need for a sturdy, easily tuneable, single frequency receiver, which will provide maximum flexibility and thoroughly dependable, unattended, continuous reception of AM radio telephone, CW telegraph or teletype, and MCW telegraph signals.

The design of this receiver is a departure from the conventional single channel receiver in that it provides for both crystal and VFO operation of the HFO and BFO. The front end is simply and accurately tuned by a single Frequency Tuning Dial with a vernier reduction ratio of 10 to 1, which permits maximum traverse speed and ease of operation. A specially designed input transformer provides an impedance matching circuit suitable for use with a straight wire antenna, a balanced doublet, and a 75 ohm unbalanced or 300 ohm balanced line.

The Model FFR is available in frequencies of 50 to 400 Kcs., 500 Kcs., and 2 to 32 Mcs. depending upon the tuning drawer used. These drawers are sturdily built and incorporate the 1st RF, 2nd RF, VFO, and Mixer circuits. This type of construction provides excellent shielding between stages and minimizes the difficulties usually encountered with this type of receiver.

When used in the TMC Model RCR Remote Control Receiver System, control of the HFO, BFO, and Sensitivity is accomplished on a tone basis; in addition, provision is made for ON/OFF control of the AVC and BFO. This feature is particularly useful when the receiver is to be used remotely for CW and phone operation. This remote control provides the following:

| TUNING DRAWER | HFO SHIFT |
|---|---|
| FFRD-1,2,3 | ±2 Kcs. |
| FFRD-3M | ±3 Kcs. |
| FFRD-5,6 | ±2 Kcs. per Mc. |
| FFRD-7 | ±1.5 Ksc. per Mc. |
| FFRD-8 | 32 Kcs. throughout the band. |

The BFO shifts not less than ±2.5 Kcs. manually and remote control.

Output terminations are provided so that two receivers may be used in diversity for CW, FS and Phone services, and either receiver may be used in the MASTER or SLAVE position by front panel switches in the BFO and HFO circuits. The AVC bus, HFO, BFO, IF, and Diode Load are all brought out to the rear of the receiver chassis for diversity inter-connection. When used in diversity, crystal control of the HFO and BFO is also possible, providing a very compact dual diversity system requiring only 10-1/2 inches of space.

## 2. DESCRIPTION OF UNIT

The Communication Receiver, Model FFR, is shown in Figure 1-1. The panel is 3/16 inches thick by 10 inches long and 5-1/4 inches high, and is finished in TMC grey enamel. The chassis extends 15 inches behind the panel and is supported to the panel on each side by brackets. The controls most often used are located on the front panel, while the terminal connections are located at the rear of the receiver chassis.

Facilities for remote control applications have been provided at the rear of the receiver. For short distance operations (within a one mile radius) a ±4.5 volts D.C. applied separately to terminals 1 and 7 (on terminal strip E-102) and a -9.5 volts D.C. applied to terminal 8 of terminal strip E-101 will provide remote control of the HFO, BFO and RF GAIN respectively. Also, a toggle switch must be connected to the BFO ON/OFF terminals and turned to its ON position. For remote control by frequency shifted tones, the TMC Remote Control Receiver System, Model RCR is used to provide the necessary control functions. In addition, any remote control system, which provides the necessary D.C. voltages as mentioned above, may be used in conjunction with the Model FFR.

Vacuum tubes are readily accessible from the top of the Model FFR and are mounted in a vertical position. All components are so mounted that trouble-shooting and maintenance may be easily accomplished.

## 3. TECHNICAL SPECIFICATIONS

Frequency Range:
H.F. 2 to 32 megacycles in four bands.
L.F. 50 to 400 and 500 kilocycles in four bands.

Band Change:
By means of plug-in tuning drawers, each

covering the following frequencies:

| | |
|---|---|
| FFRD-1 | covers 50-100 Kcs. |
| FFRD-2 | covers 100-200 Kcs. |
| FFRD-3 | covers 200-400 Kcs. |
| FFRD-3M | covers 500 Kcs. |
| FFRD-5 | covers 2-4 Mcs. |
| FFRD-6 | covers 4-8 Mcs. |
| FFRD-7 | covers 8-16 Mcs. |
| FFRD-8 | covers 16-32 Mcs. |

Type of Reception:
AM, CW, and MCW signals. FS when used with appropriate Audio of IF type Frequency Shift Converter.

Tuning System:
Single dial control.

Antenna Input Circuit:
75 ohms unbalanced, 300 ohms balanced.

Oscillator Circuit:
Variable Manual Tuning
Fixed Frequency Crystal
External Excitation from Master Osc.

BFO Circuit:
Variable Manual Tuning
Fixed Frequency Crystal
External Excitation from Master Osc.

Sensitivity:
1.0 micro volt for a 10 db Signal to Noise Power ratio.

Image Ratio:
Better than 60 db for 2-16 Mcs., not less than 40 db for 16-32 Mcs.
Image Rejection Infinite on L.F. Heads.

AVC Characteristics:
With an 80 db change in the input signal, the output remains constant within 12 db.

Hum Level:
Across 600 ohm load, output hum not less than 34 db below 0 dbm or 66 db across 2 watts.

Output Power:
2 watts maximum.

Input Power:
110/220 volts, 50/60 cycles, approximately 85 watts.

Noise Limiter:
A Noise Limiter circuit is provided, which provides maximum effectiveness in combating impulse noise.

Rear Panel Facilities:
Antenna Connections.
Fuse.
BFO Connections.
HFO Connections.
IF Connections.

Accessary Voltage Source:
6.3 volts AC @ 1 amp
150 volts DC @ 10 milliamps

Front Panel Controls:

| Main Chassis | Tuning Drawers |
|---|---|
| Noise Limiter Switch. | Tuning Dial. |
| Pilot Light. | HFO Master-Slave Switch. |
| Audio Gain Control. | Crystal Trimmer. |
| Phone Jack. | Tuning Dial Lock. |
| BFO Master-Slave Switch. | Selectivity Switch on Band 1, 2 and 3 |
| AVC/MANUAL Switch. | |
| BFO ON/OFF Switch. | |
| RF Gain Control and Power ON/OFF Switch. | |
| BFO Pitch. | |

Rear Panel Facilities
terminals provided for:

| | |
|---|---|
| HFO control | RFG control |
| HFO IN | AVC ON/OFF |
| HFO OUT | AVC Bus |
| BFO control | Diode Load |
| BFO IN | Loudspeaker |
| BFO OUT | ANTENNA |
| IFO OUT | |

Mounting:
Standard WE rack mounting.

Size and Weight:
19'' wide x 5 1/4'' high x 15'' deep, (w/coaxial), approximately 35 lbs.

Tube Complement:
FFR
3 each 6BA6, IF Amplifier.
1 each 6AL5, Detector and AVC.
1 each 6T8, Noise-Limiter, Audio.
1 each 6AQ5, Audio.
1 each 6J6, BFO Reactance Tube.
1 each 6AG5, BFO Oscillator.

1 each 5Y3GT, Rectifier.
1 each OA2, Voltage Regulator.

FFRD-1,2,3,3M,5,6, and 7:
4 each 6AG5, RF Amplifiers, HFO.
1 each 6AU6 Mixer.

FFRD-8:
3 each 6AK5 RF Amplifiers, HFO.
1 each 6AU6 Mixer.
1 each 6AG5 HFO Reactance Tube.

Construction and Components:
Equipment is manufactured in accordance with JAN specifications wherever practicable.

* * *

We reserve the right to make changes in the design of our equipment, consistent with good engineering practice, in order to make improvements in design and to effect economies in manufacture.

**TABLE 1-1. PERFORMANCE DATA**

(Approximate Values - Taken from Production Receiver)

| Head | Frequency Kc | Sensitivity in Microvolts for 1 volt across diode load (Approx. 2 watts output) | Antenna Input in Microvolts for 10 db Signal - Noise Ratio | I.F. Rejection db |
|---|---|---|---|---|
| FFRD-1 | 50<br>75<br>100 | 1.10<br>1.20<br>1.00 | 1.10<br>1.20<br>1.00 | 134<br>120<br>110 |
| FFRD-2 | 100<br>150<br>200 | 1.10<br>1.20<br>1.20 | 1.10<br>.85<br>1.30 | 114<br>106<br>92 |
| FFRD-3 | 200<br>300<br>400 | 1.30<br>0.07<br>0.55 | 1.30<br>1.20<br>0.65 | 100<br>90<br>60 |
| FFRD-3M | 485<br>500<br>515 | 0.60<br>0.50<br>0.40 | 0.80<br>0.80<br>0.80 | 50<br>60<br>68 |

| | Frequency Mc | | | Image Ratio |
|---|---|---|---|---|
| FFRD-5 | 2.0<br>3.0<br>4.0 | 0.40<br>0.50<br>0.60 | 0.62<br>0.64<br>0.68 | 132000<br>24000<br>9600 |
| FFRD-6 | 4.0<br>6.0<br>8.0 | 0.40<br>0.60<br>0.65 | 0.52<br>0.56<br>0.58 | 32000<br>6500<br>1600 |
| FFRD-7 | 8.0<br>12.0<br>16.0 | 0.50<br>0.10<br>1.00 | 0.65<br>0.85<br>0.90 | 12000<br>3000<br>1000 |
| FFRD-8 | 16.0<br>24.0<br>31.0 | 0.75<br>0.60<br>0.40 | 0.60<br>0.67<br>0.72 | 2400<br>500<br>290 |

## TABLE 1-2. NORMAL SELECTIVITY

(Approximate Values - Taken from Production Receiver)

| BAND | FREQUENCY | 6 db POINTS | 60 db POINTS |
|---|---|---|---|
| FFRD - 1 | 50 Kcs.<br>100 | 2 Kcs.<br>4 | 14 Kcs.<br>17 |
| FFRD - 2 | 100<br>200 | 2.5<br>4.3 | 14<br>19 |
| FFRD - 3 | 200<br>400 | 4.1<br>4.8 | 17<br>20 |
| FFRD - 3M | 500 | 3.8 | 12 |
| FFRD - 5,6,7,8 | 2 to 32 Mcs. | 5 | 25 |

NOTE:- On the low frequency heads (FFRD 1, 2 and 3) the BANDWIDTH control provides four positions of selectivity - one normal as indicated above and three narrow positions providing bandwidths of 1.3 Kc, .5 Kc and .3Kc.

# SECTION II
# THEORY OF OPERATION

## 1. GENERAL DESCRIPTION OF CIRCUITS

The design of the Model FFR featuring versatility and steady performance assures continuous reception of phone and code signals over its entire frequency range. Two R.F. and three I.F. stages provide a high degree of sensitivity, selectivity, and image rejection to insure uninterrupted reception. A noise-limiter, effective on both code and phone reception, reduces pulse interferences. Other circuit refinements feature a minimum of frequency drift in the oscillators, a high gain audio stage, a manual gain control and a manual volume control.

The Model FFR utilizes 10 tubes, plus 5 more for each drawer, in a superheterodyne circuit, shown schematically in Figure 4-5. The circuitry employed consists of 2 stages of R.F. amplification, a mixer, HFO oscillator, HFO oscillator reactance control, 3 stages of I.F. amplification, detector and A.V.C., BFO oscillator, BFO oscillator reactance tube, noise limiter, A.F. amplifier, and an integral power supply system.

Contained in each of the drawers are 2 RF. amplifiers, a mixer, an H.F. Oscillator, and an HFO reactance tube. In the FFRD-1,2 and 3 drawers a bandwidth control provides four degrees of selectivity. At the rear of each drawer is a multiple connector plug by which the antenna circuit, the I.F. input, HFO output HFO input, external oscillator injection, R.F. gain control and the power supply voltages are connected to the receiver proper.

The main chassis deck consists of the I. F. strip, the audio amplifier, and the BFO assembly. The associated operating controls are mounted on the front panel of the receiver. The I.F. is centered at 455 Kcs.

## 2. CIRCUIT ANALYSIS

A block diagram, Figure 2-1, shows the arrangement and functions of the various circuit sections. Constant reference to both the schematic and block diagrams will facilitate a more thorough understanding of the unit and will serve to illustrate the basic composition of the Model FFR.

INPUT COUPLING.- The antenna input terminals are provided at the rear of the receiver. An efficient coupling system between the antenna and the first RF tube provides sufficient gain to override the "shot effect" and thermal agitation originating in the first tube and its associated circuits. The antenna coupling is designed to provide optimum coupling from a 300 ohm balanced or a 75 ohms unbalanced line. A balanced doublet or straight wire antenna may also be used.

RF AMPLIFIERS AND MIXER.- Maximum sensitivity at high signal to noise ratio is assured by the design of the R.F. amplifiers. The coil assemblies of the amplifiers, together with those of the mixer and HFO oscillator, are placed directly adjacent to their respective sections of the four-gang tuning capacitor and their respective tubes. To insure stability and minimize oscillator radiation, the coils are enclosed in grounded shielded containers; input and output circuits are well isolated to prevent any possible regeneration. A 6AU6 triode-connected mixer is used for maximum conversion gain and low noise factor.

HIGH FREQUENCY OSCILLATOR.- The high frequency oscillator is aligned to track with the R.F. Amplifiers to produce a 455 Kc intermediate frequency in the Mixer output. A front panel switch controls the H.F.O. for Master-Slave or crystal-controlled operation. For remote control purposes, a d.c. voltage (such as obtained from the TMC Model RCR) of 0 to ±4.5 volts is connected to the HFO external terminal at the rear of the receiver. This voltage controls the center frequency of the oscillator by varying the output impedance of the reactance modulator. The oscillator voltage is regulated by the OA2 regulator tube to provide maximum frequency stability under variable conditions of power supply voltage.

I.F. AMPLIFIERS.- Three separate I.F. stages of amplification are employed and provide adequate gain. Each I.F. transformer has its primary and secondary tuned by means of powdered iron cores. Eight tuned circuits in the I.F. system provide the necessary I.F. selectivity.

DETECTOR AND AVC.- The detector and AVC functions are performed by the dual-diode 6AL5. Both the detector and AVC load connections are brought out to the rear terminal strip for diversity reception. One plate of the diode section of the tube is used for signal detection and the other for

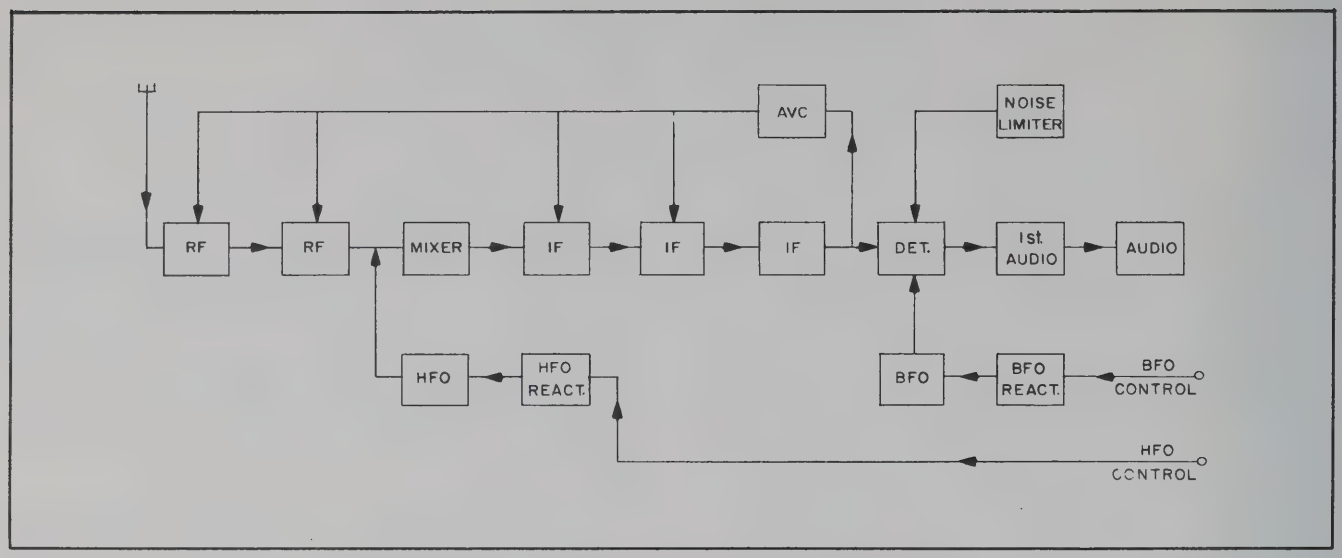



Figure 2-1. Block Diagram for the Model FFR.

AVC rectification. The AVC voltage is connected to the 1st and 2nd R.F. amplifiers and to the grids of the 1st and 2nd I.F. amplifiers. Thus good AVC characteristic is obtained. The time constant is approximately .01 second.

BFO OSCILLATOR.- The beat frequency oscillator employs a magnetic-coupling circuit, which provides stability and a minimum of oscillator harmonics. A front panel switch, similar to the one used in the HFO, controls the BFO for Master-Slave or crystal-controlled operation. Likewise, a BFO External Control terminal on the rear of the unit permits remote control operation of the BFO tuning, when a d.c. voltage of ±4.5 volts is applied.

NOISE LIMITER.- A series-diode noise limiting circuit effects noise reduction on CW or modulated reception when inpulse noise is present. A front panel switch, S-100, permits the optional use of the noise limiter. The second part of the 6T8 is a resistance-coupled audio-amplifier triode, in whose grid is placed the conventional audio-volume control.

AUDIO-OUTPUT.- The 6AQ5 beam power amplifier, driven by the triode section of the 6T8 tube, delivers 2 watts into an 8 or 600 ohm load. A phone jack available on the front panel permits use of a headset of 600 ohms impedance or higher under normal conditions.

IF OUTPUT.- An IF output voltage at 455 Kcs. is available at the rear of the unit. This voltage is of sufficient amplitude to drive a wide variety

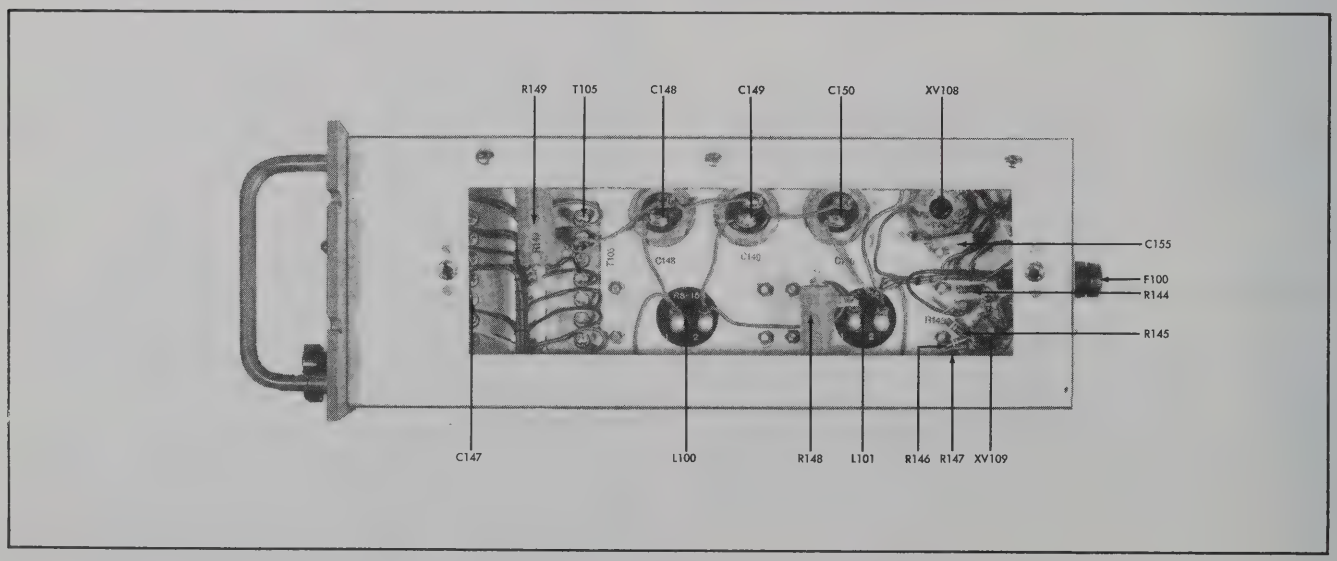



Figure 2-2. Right Side View Showing Power Supply Connections.

of equipment such as the TMC Diversity Combining Unit (Model DCU), the TMC Diversity Visual Monitor (Model DVM), and the TMC Mode Selector Receiving (Model MSR-1).

RF GAIN CONTROL.- The RF gain control is provided for the manual control of the sensitivity to prevent overloading in the presence of strong signals and operates on either position of the MANUAL or AVC switch. Rear panel terminals are provided for remote control of the RF Gain.

POWER SUPPLY.- The power supply is self-contained and consists of a power transformer, rectifier, voltage regulator, and filter. It is designed for 110/220 volts, 50/60 cycles, single phase operation, with a power consumption of approximately 85 watts. The power supply includes a voltage regulator system which compensates for changes of load and line voltage, holding the voltage more constant. Adequate filtering is provided to prevent line noise and stray voltages from entering the receiver by way of the power line.

# SECTION III
# INSTALLATION AND OPERATION

## 1. INSTALLATION

### A. UNPACKING

The Communication Receiver, Model FFR has been designed for ease of installation and minimum effort in operation. The unit comes in its individual shipping container and should be carefully unpacked. A close visual inspection should be made to ascertain any physical damage due to rough handling during shipment.

### B. POWER SUPPLY

The unit is designed for operation from a 110 volts A.C. 50/60 cycles source, unless it is specifically ordered for 220 volts A.C., 50/60 cycles. The receiver is shipped from the factory with the power transformer wired for 110 volts A.C. operation only. However, a simple wiring change in the tapped primary circuit of the power transformer is necessary to change the Model FFR for 220 volts A.C. operation. This change is made directly on the power transformer terminal lugs and is as follows:

Connect the power line to terminals "1" and "3" on the primary power transformer winding, as indicated on the schematic diagram.

### C. ELECTRICAL CONNECTIONS

The antenna connections should be made at the proper terminals at the rear of the unit. The input impedance has been designed to match a balanced 300 ohm or an unbalanced 75 ohm transmission line. When using a balanced 300 ohm line, one side is to be connected to point "1" and the otherside to point "2"; when using a 75 ohm unbalanced line, line connection may be made in one of two methods. (a) Connect the shield to the ground terminal, point "3", and the center conductor to point "1" (Refer to terminal E-100 on the schematic diagram.) or (b) Connect through a PL-259/A type connector to J 109. A jack is provided on the front panel for plugging in a pair of headphones. Both high and low impedance headphones may be used in the phone jack. Audio output terminals for connection of a loudspeaker are provided at the rear of the receiver (terminal E-101). The output transformer is designed to match a speaker having either 8 ohms or 600 ohms impedance.

After unpacking, install receiver as follows:

1. Seat the tubes firmly in their sockets.
2. Connect a loudspeaker to the 8 ohm or 600 ohm terminals on E-101 (on the rear chassis) or a headset to the phone jack (J-106) on the front panel.
3. Connect the antenna according to the instructions set forth in the above paragraph.
4. Connect the power cord to a 110 volts, 50/60 cycles source of supply.
5. Set the controls for operation as set forth in Section III-2B.

The unit may be placed on a table or mounted in a rack. The panel is equipped with standard slots for rack mounting. Before mounting the receiver in the rack, inspect the tubes to see that they are firmly seated in their respective sockets. Once the desired converter drawer has been selected, the operator must be certain to tighten the lock nuts on the front panel in order to secure the drawer to the main chassis.

## 2. OPERATION

### A. DESCRIPTION OF CONTROLS.

All controls are identified by the front panel markings for ease of identification and are arranged for ease of operation. Figure 3-1 illustrates the dial and control knobs.

The MAIN TUNING DIAL is in the lower right corner of each converter drawer. The knob operates the four gang-tuned capacitors and turns the dial scale through a vernier gear-train reduction of 10 to 1. The dial is calibrated directly in megacycles. A lock on the shaft of the main tuning dial effects positive locking action without disturbing the frequency setting.

The XTAL △ FREQ. control in the upper left corner of the converter drawers operates a tuning capacitor, which is connected across the crystal in the HFO oscillator circuit. This control is used to adjust the crystal on frequency when crystal-control of the HFO is desired.

The HFO MASTER-SLAVE switch, on the lower left corner of each drawer, is a two pole, three position switch, and, starting from fully counterclockwise, permits optional External, Xtal, or HFO operation in the HFO circuit. The crystals for each frequency range are not supplied for the separate drawers.

The R. F. GAIN CONTROL is a continously variable sensitivity control used with the AUDIO

GAIN control for all manual operation. Clockwise rotation increases the gain of the I.F. and R.F. stages. The A. C. POWER switch (S102) is associated with the R.F. GAIN control, and the A.C. power is tuned "On" as the R.F. GAIN control is as turned clockwise from its extreme counter-clockwise position.

The A.F. GAIN control adjusts the amount of audio voltage applied to the first audio tube. Clockwise rotation of this control increases the audio output power of the receiver.

The AVC-MANUAL toggle switch adjusts the receiver for either AUTOMATIC VOLUME CONTROL or MANUAL VOLUME CONTROL. The AVC can be used for both phone and code reception.

The NOISE-LIMITER toggle switch sets the unit for operation of noise limitation. Any noise peak voltages in excess of the set threshold are prevented from reaching the audio amplifiers. The limiter circuit is a series diode type and is equally effective for both phone or code reception.

The BFO CONTROL (S-104) turns on the BFO oscillator and is used for CW code reception. The CW code characters are made audible by the heterodyning action of the BFO with the IF signal frequency.

The BFO PITCH control operates a tuning capacitor (C137) across the tank circuit of the BFO oscillator. Turning of the knob in either direction of zero set changes the resonant frequency to give the desired pitch.

The BFO MASTER-SLAVE switch is similar to the HFO MASTER-SLAVE control and permits optional EXTERNAL, XTAL, or BFO operation in the BFO circuit.

Refer to Figure 4-3 for a complete description of switch control settings and terminal board wiring for various modes of operation.

## B. TUNING PROCEDURE

Initially, the operator must select the converter drawer covering the desired frequency range and plug the draw into the receiver proper. After the unit is mounted, he must adjust the receiver controls in the following manner:

1. Turn the R.F. GAIN control to the "On" position. The front panel light should be lighted.
2. Set the HFO MASTER-SLAVE switch on the front panel to the HFO position. If crystal-controlled operation of the HFO is desired, set the switch to the XTAL position.
3. Set the RF GAIN control fully on and the A.F. GAIN volume control to the desired audio level.
4. Set the NOISE-LIMITER and AVC-MANUAL controls to the desired mode of operation.
5. In the FFRD-1, 2 and 3 set the BANDWIDTH switch to NORMAL. If antenna noise is excessive or interference is pronounced, increase the selectivity to improve reception.
6. Tune in to the desired station via the main tuning dial.
7. Once the desired frequency is attained, adjust the RF GAIN control, AVC-MANUAL control, and the A.F. GAIN volume control to the desired value.

The receiver is now adjusted for phone reception and will tune to the frequency shown on tuning dial. When the AVC is being used, the R.F. GAIN control should be advanced as far as receiving conditions permit. However, the R.F. GAIN control may be retarded to reduce any objectionable disturbances or noise background. The operation of the A.V.C. will be restricted unless the R.F. GAIN control is fully advanced. The operator should adjust the audio output volume entirely by use of the A.F. GAIN control.

For C.W. reception the receiver is tuned in the same manner as described above, except that the BFO CONTROL switch is turned to its "On" position and the BFO MASTER-SLAVE switch is set to its BFO position. If crystal-controlled operation of the BFO is desired, set the latter switch to its XTAL position, and insert a BFO XTAL whose frequency produces the desired pitch with the IF signal frequency. When the BFO MASTER-SLAVE switch is on the XTAL position, the BFO PITCH control is inoperative. In the presence of a strong CW signal, the BFO injection may not be sufficient to give good heterodyne action, in which case the RF GAIN should be reduced to a desirable level. The BFO injection has been optimized around weak and medium strength signals. A large BFO injection causes a higher AVC voltage to be developed and thereby decreasing the basic receiver sensitivity.

## C. DIVERSITY OPERATION

When properly spaced individual antennas are available, two Model FFR receivers may be used for diversity reception. Figure 3-3 illustrates the proper connections for diversity operation. The AVC terminals of the two receivers must be connected together with a patch cable; likewise, the DETECTOR terminals.

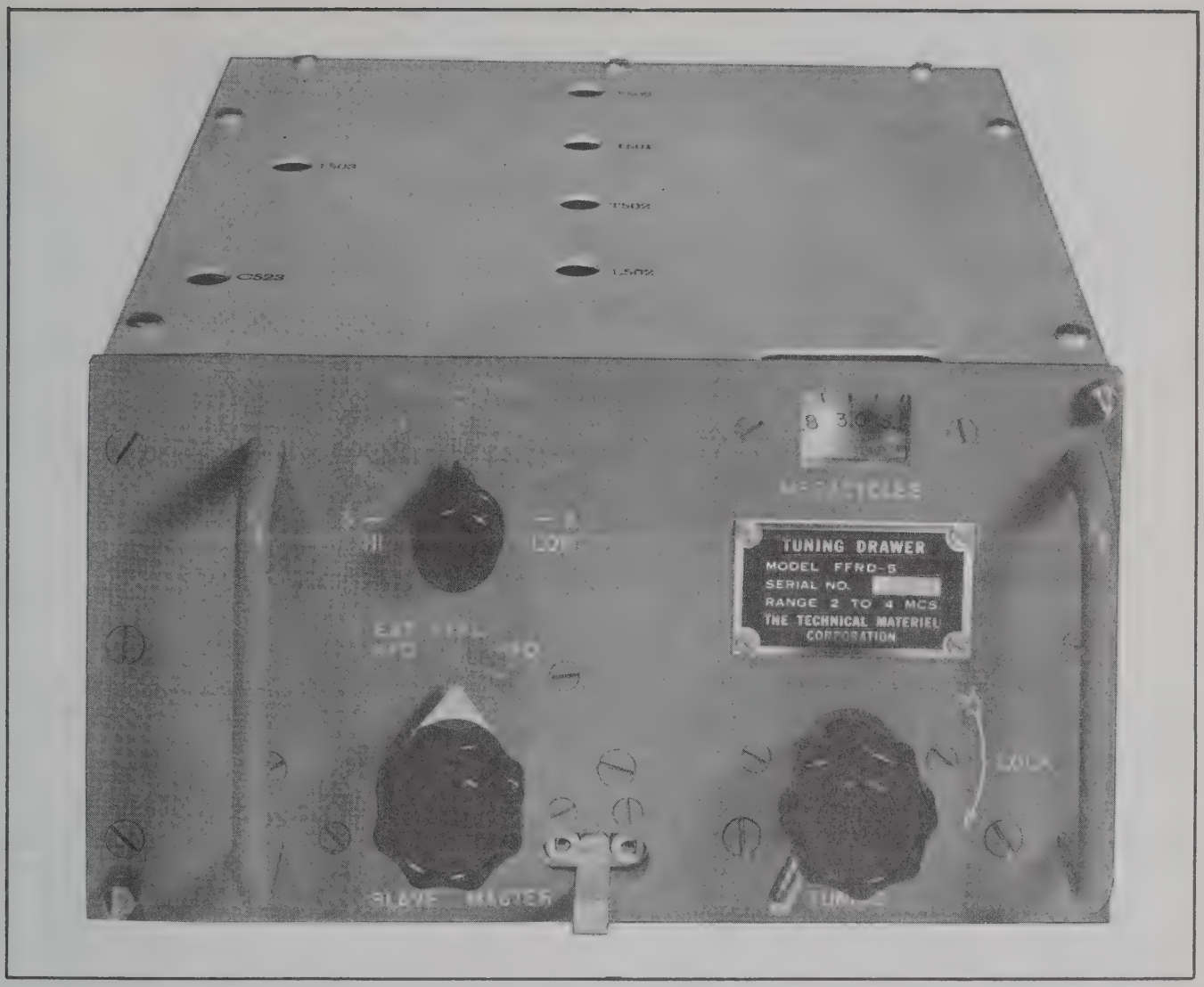



Figure 3-1. Front View, Model FFRD-* ( H F Head)

Refer to Figure 4-3 for a complete description of switch control settings and terminal board wiring for various modes of operation.

Since the audio output of only one receiver is required, the operator should turn down the audio gain on one receiver and use only the gain of the other. Single oscillator control is obtained by connecting a shielded, low capacitance cable from the HFO OUTPUT connector (J-102) of one receiver to the HFO INPUT connector (J-101) of the other receiver, and setting the HFO MASTER-SLAVE switches of both receivers to the HFO and EXTERNAL-SLAVE positions, respectively. Or, if an external, precision oscillator is used, such as the TMC Variable Frequency Oscillator (Model VOX), both receivers should be set to the EXTERNAL-SLAVE position. The BFO may be set in exactly the same manner, in this instance, by using connectors J-104 and J-103. For crystal controlled operation of either both the HFO and BFO, insert a crystal in the master receiver and set the MASTER-SLAVE switch to the "XTAL" position; do not insert a crystal in the slave receiver, but merely set the MASTER-SLAVE switch to the EXT position.

D. REMOTE CONTROL.

The terminal strips E101 and 102 at the rear of the receiver provides all connections for remote control operation.

Refer to Figure 4-3 for a complete description of switch control settings and terminal board wiring for various modes of operation.

The normal audio output at 600 ohms can be in the range of 20 to 30 volts. Since accidental imposing of such levels on a conventional tele-

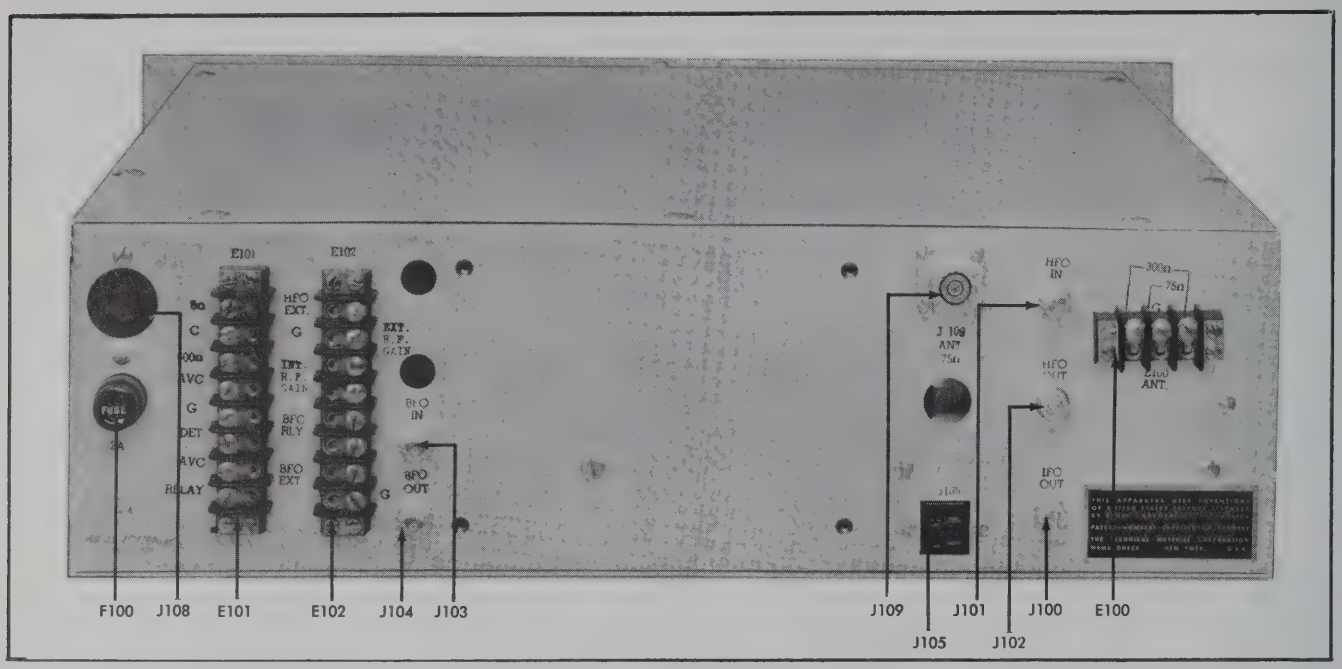



Figure 3-2. Rear View., Model FFR.

phone line will cause excessive over-loading, it is suggested that a 20 db "T" pad be inserted at the output terminals (Terminal Board E101, Terminals 2 and 3) of the FFR. This addition limits the receiver audio reserve so that wide variations in the remotely controlled R.F. Gain will not heavily over-load the telephone lines with audio signal. Standard 1/2 watt, carbon resistors of a 470 ohm value for the series arms and 120 ohms for the shunt arm may be used. In the event more output is desired the "T" pad may, of course, be omitted or removed, as the case may be.

In all operations of the Model FFR, once the correct frequency is set on the receiver, the operator should tighten the dial lock on the panel drawer. The final adjustments and tightening of

## CRYSTAL-CONTROLLED OPERATION OF THE HFO AND BFO

The operating range of the crystal controlled HFO circuits are as follows:

| TUNING DRAWER | SIGNAL FREQUENCY RANGE | OSCILLATOR FREQUENCY RANGE | CRYSTAL TYPE (Holder-HC-6/U) | CRYSTAL FREQUENCY MODE |
|---|---|---|---|---|
| FFRD-1 | 50-100 Kc | 505-555 Kc | CR- 4/U | Parallel Resonence Fundamental |
| FFRD-2 | 100-200 Kc | 555-655 Kc | CR- 4/U | Parallel Resonence Fundamental |
| FFRD-3 | 200-400 Kc | 655-855 Kc | CR- 4/U | Parallel Resonence Fundamental |
| FFRD-3M | 500 Kc | 955 Kc | CR-18/U | Parallel Resonence Fundamental |
| FFRD-5 | 2-4 Mc | 2.455-4.455 Mc | CR-18/U | Parallel Resonence Fundamental |
| FFRD-6 | 4-8 Mc | 4.455-8.455 Mc | CR-18/U | Parallel Resonence Fundamental |
| FFRD-7 | 8-16 Mc | 8.455-16.455 Mc | CR-18/U | Parallel Resonence Fundamental |
| FFRD-8 | 16-32 Mc | 16.455-32.455 Mc | CR-18/U | Parallel Resonence 2nd Harmonic |

the dial lock should be done only after the receiver has had adequate time to reach operating stability, i.e. two or three hours.

The crystal frequency is determined as follows:

(1) When the signal frequency lies between 50 kcs.-16 mcs.

$F_{(osc)} = F_{(sig)} + 0.455$, where

$F_{(osc)} = F_{(xtal)}$ = oscillator frequency in mcs.

$F_{(sig)}$ = signal frequency in mcs.

(2) When the signal frequency lies between 16-32 mcs,

$$F_{(osc)} = F_{(sig)} + 0.455 \text{ and}$$

$$F_{(xtal)} = \frac{F_{(osc)}}{2}$$

When the front end of the receiver is crystal-controlled, crystal control of the BFO may also be desirable. A CR-46/U crystal unit is required for the BFO circuit. The BFO crystal frequency is determined by the pitch or tone desired, as follows:

(3) $F_{(BFO)} = 455 \text{ kc} \pm F_{(tone)}$, where

$F_{(BFO)}$ = BFO crystal frequency in kcs.

$F_{(tone)}$ = desired beat note or pitch in kcs.

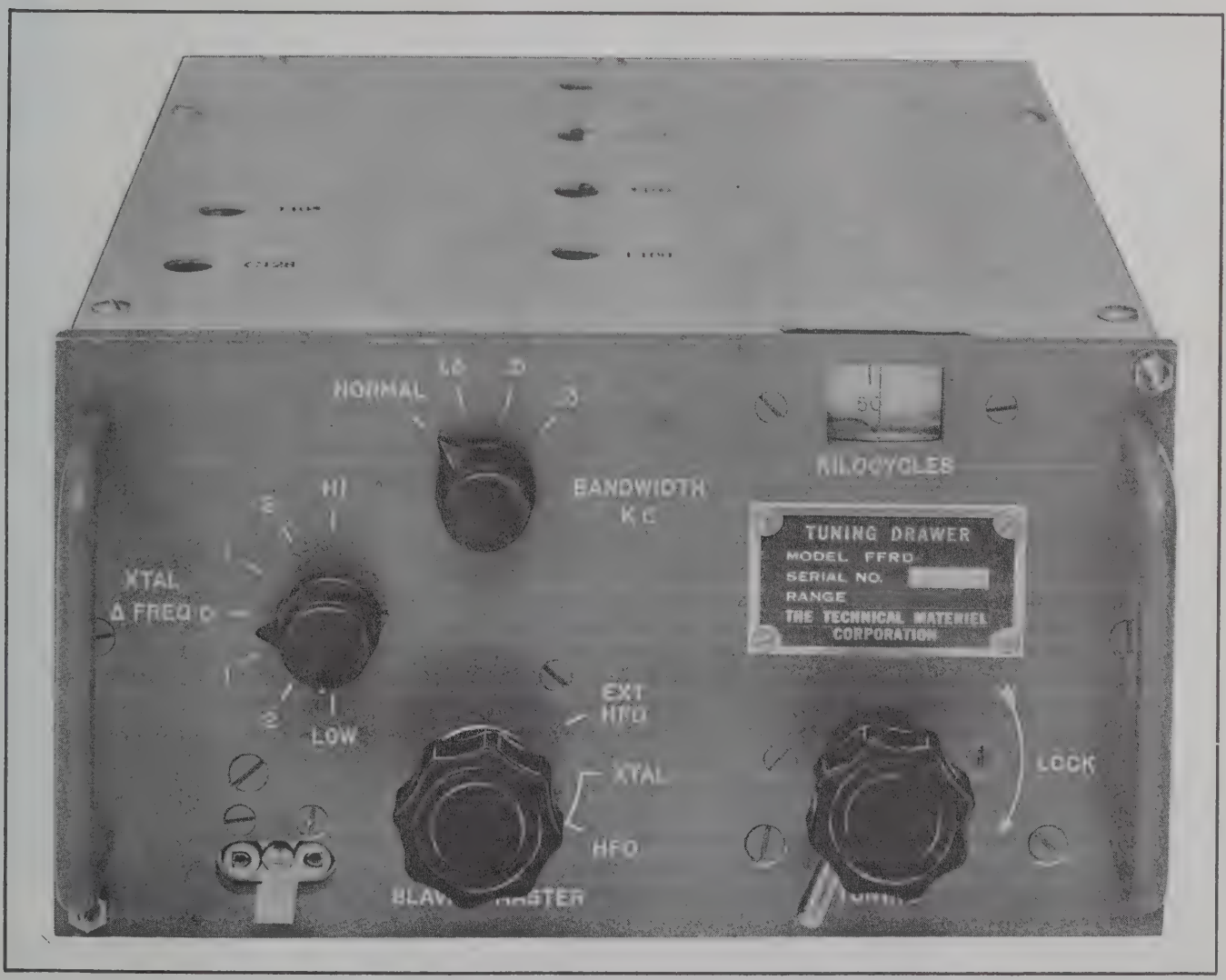
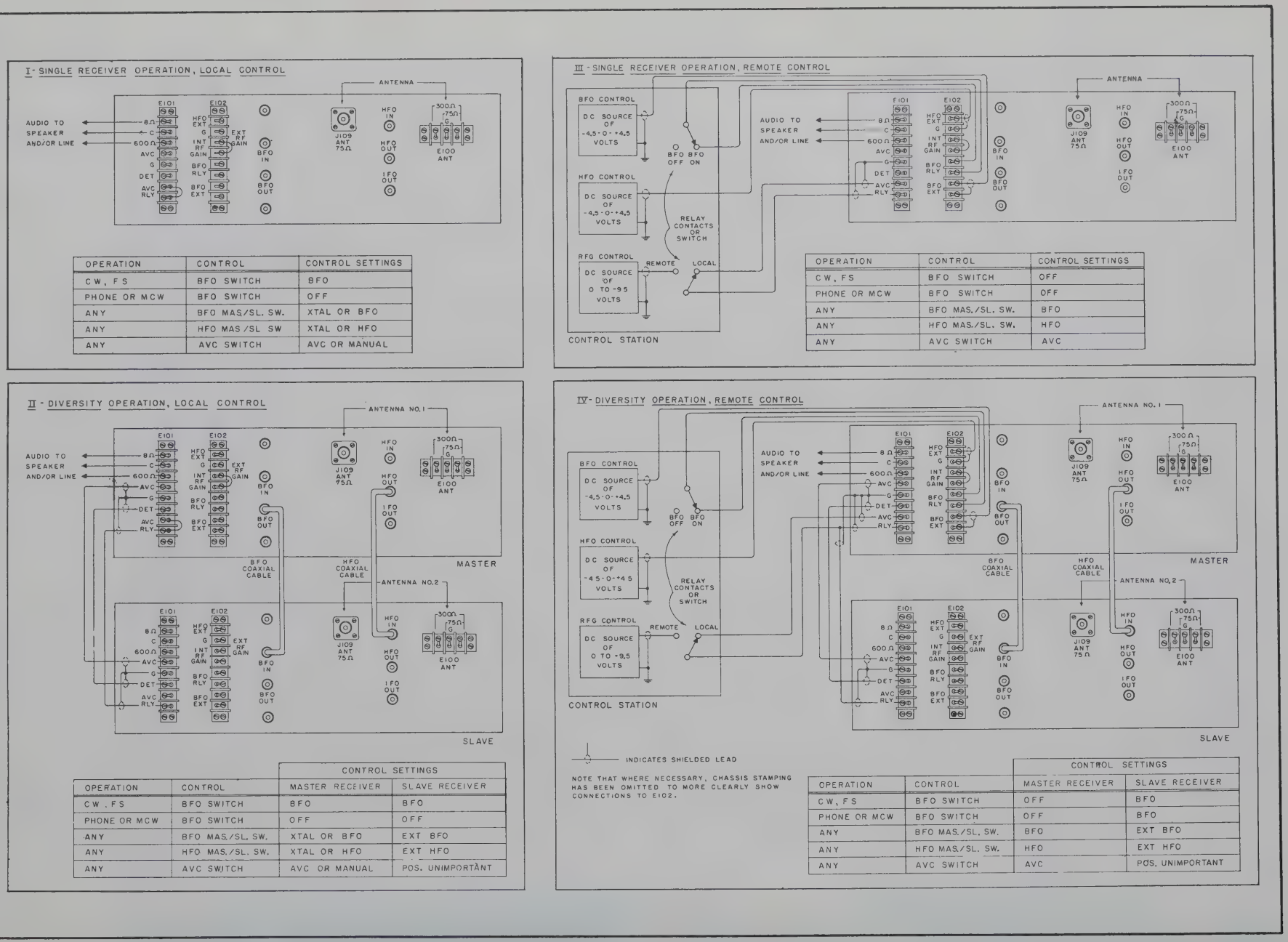



Figure 3-3. Front View, Model FFRD-* (LF Head)




| OPERATION | CONTROL | CONTROL SETTINGS |
|---|---|---|
| CW, FS | BFO SWITCH | BFO |
| PHONE OR MCW | BFO SWITCH | OFF |
| ANY | BFO MAS./SL. SW. | XTAL OR BFO |
| ANY | HFO MAS./SL SW | XTAL OR HFO |
| ANY | AVC SWITCH | AVC OR MANUAL |

| OPERATION | CONTROL | CONTROL SETTINGS |
|---|---|---|
| CW, FS | BFO SWITCH | OFF |
| PHONE OR MCW | BFO SWITCH | OFF |
| ANY | BFO MAS./SL. SW. | BFO |
| ANY | HFO MAS./SL. SW. | HFO |
| ANY | AVC SWITCH | AVC |

| OPERATION | CONTROL | CONTROL SETTINGS | |
|---|---|---|---|
| | | MASTER RECEIVER | SLAVE RECEIVER |
| CW, FS | BFO SWITCH | BFO | BFO |
| PHONE OR MCW | BFO SWITCH | OFF | OFF |
| ANY | BFO MAS./SL. SW. | XTAL OR BFO | EXT BFO |
| ANY | HFO MAS./SL. SW. | XTAL OR HFO | EXT HFO |
| ANY | AVC SWITCH | AVC OR MANUAL | POS. UNIMPORTANT |

| OPERATION | CONTROL | CONTROL SETTINGS | |
|---|---|---|---|
| | | MASTER RECEIVER | SLAVE RECEIVER |
| CW, FS | BFO SWITCH | OFF | BFO |
| PHONE OR MCW | BFO SWITCH | OFF | BFO |
| ANY | BFO MAS./SL. SW. | BFO | EXT BFO |
| ANY | HFO MAS./SL. SW. | HFO | EXT HFO |
| ANY | AVC SWITCH | AVC | POS. UNIMPORTANT |

**Figure 3-4. Connections and Control Settings, Model FFR.**

# SECTION IV
# MAINTENANCE

## 1. SERVICE MAINTENANCE

### A. GENERAL

The Model FFR has been designed for rugged, long term, trouble free duty. Familiarity with the receiver will permit quick frequency change, and once the receiver is properly adjusted, little attention beyond normal maintenance is required. It is recommended that any maintenance to the equipment be performed by a competent maintenance technician. The power supply system has been protected by a fuse easily accessible at the rear of the receiver. Power fuse failure in the receiver would normally be indicated by failure of the red pilot light to be on when the unit is turned on. If a fuse burns out immediately after replacement, do not replace it a second time until the cause has been corrected.

The location of all tubes and components in the Model FFR are shown in Figures 4-1 and 4-2. Normally, the tubes used in this unit have a long useful life, although occasionally a defective tube may be encountered and must be replaced. The tubes may be checked visually to see if they are lighted, or for warmth. When necessary, the tubes should be carefully removed and tested, and when replaced, care should be taken to install tube shields.

### B. PREVENTIVE

All tubes and components in the Model FFR have been carefully selected to assure maximum efficiency in operation. If the receiver sensitivity is reduced and tube failure is suspected, test each tube one at a time in a reliable tube tester. Replace the tube in the same socket from which it was removed, if its measured characteristics are within the manufacturers tolerances (usually +20% from tube manual values). No special selection is necessary in the event of tube replacement, but the operator should remember that tubes of the same type will vary slightly in their individual characteristics.

Failure may occur due to the breakdown of a capacitor or resistor. Test all DC and AC voltages as indicated on the tube voltage and resistance data sheets, Figure 4-2, and investigate any serious discrepancies. A faulty bypass capacitor may cause overload of associated resistors, which should be checked for any change in resistor value. A shorted resistor may be sighted by scorching or discoloration marks on the surface of the resistor. An open capacitor may cause unwanted oscillations and may be checked by connecting a good capacitor across it.

In order to prevent actual failure of the equipment due to corrosion, dust, and other destructive ambient conditions, it is recommended that the inside of the chassis be thoroughly inspected for signs of dirt, dampness, molding, charring, and corrosion, and to correct any defect found with a charring agent of proven quality. When placing the Model FFR in the rack, the operator should make certain that all terminal screw connections at the rear of the receiver are tight.

## 2. CIRCUIT ALIGNMENT

The circuits in the Model FFR have been carefully aligned with precision instruments at the factory, and realignment should be undertaken only when sub-par performance of the receiver against its normal operation is determined. A fiber screw-driver is recommended to make all the screw-type adjustments necessary for alignment. The TMC Tone Demodulator, Model AMD should be disconnected during alignment.

### A. THE I.F.

It is recommended that the I.F. strip be aligned first. The receiver should be set up in the same manner as described in Section III-1C with no antenna lead-in and loudspeaker connected. The test instruments to be used are an accurate signal generator and a high-impedance A.C. voltmeter. The signal generator should be modulated 30 percent at 400 or 1000 cycles. Connect a 600 ohm load to the rear of the receiver and the A.C. voltmeter across the load; the signal-generator should be so adjusted as to give a 20-25 volt reading on the voltmeter. The I.F. is 455 kcs. In order to accurately calibrate a 455 kc test signal from the signal generator, a precision 455 kc crystal is placed in the BFO circuit (Y-100 on the schematic), and the BFO MASTER-SLAVE switch is set to the XTAL position. Then with the controls set as follows:

1. The BFO switch to ON position.
2. The AVC-MANUAL switch to the MANUAL position.
3. The A.F. GAIN turned on maximum.
4. The R.F. GAIN turned on maximum.

5. The NOISE-LIMITER switch to the OFF position.

Proceed as follows:

a. Set the HFO MASTER-SLAVE switch to the EXTERNAL position. The HFO is now acting as an amplifier.

b. Inject a 455 kc unmodulated signal from the signal generator to the HFO INPUT jack (J-101)

c. Vary the tuning dial of the signal generator until a "Zero Beat" is obtained. This beat will be evidenced by a sharp peaked response on the output meter; a headset or loudspeaker may also be used to hear the "Zero Beat".

This frequency is then that of the crystal and the I.F. alignment is made to this frequency, which is not to be disturbed for the remaining alignment. It may be necessary to adjust the signal generator output to prevent overload of the I.F. amplifiers.

Without changing the frequency setting of the signal generator, turn on the modulation of the signal generator and turn the BFO switch to the OFF position. The I.F. tuned, powdered-core transformers, T-101, T-102, T-103, and T-503 (T4, 603, 703, 803 for the 3M, 6, 7, and 8 bands, respectively) should be carefully adjusted to give a maximum output on the voltmeter.

For the low frequency heads a sweep generator and oscilloscope are desired for correct alignment. Connect the sweep generator to the HFO INPUT jack (J-101). Connect the scope across the detector terminals (5 & 6 of E101). Adjust the sweep generator input voltage so as not to overload the receiver and produce a distorted bandpass pattern.

Adjust T103 and L101 (T203, L201; T303, L301 for bands 2 & 3) for a maximum peak on the scope. Adjust the crystal phasing trimmer C123 (C223, 323) for a clear symmetrical wave form. Care must be used in adjusting L101 and C123 for symmetry, otherwise a rejection notch will appear on either skirt of the wave form. The other two positions of the BANDWIDTH switch do not require adjustment.

At this point, turn off the modulation; switch the BFO switch to the ON position; and set the BFO MASTER-SLAVE switch to BFO. Set the BFO PITCH control on the front panel to its "Zero" position. At this setting the BFO oscillator should produce a "Zero Beat" with the 455 kcs test signal. In the event that there is no "Zero Beat" at the "Zero" setting, tune the adjustable inductor (L-103) on the bottom of the receiver until a "Zero Beat" occurs at the "Zero" setting.

B. THE BFO REACTANCE TUBE.

Adjustment of the BFO Reactance Tube (V-106) requires a ±4.5 D.C. voltage to be applied between point 7 and ground on terminal board E-102 at the rear of the receiver. A high impedance vacuum tube voltmeter whose scale is thrown off zero to obtain center scale reading, such as the RCA Volt-Ohmyst model, is connected across points 7 and 8 on E-102. The BFO switch is set to its ON position, and the BFO PITCH control is set to its Zero position. Then proceed as follows:

1. Set up an oscilloscope for external sweep. Connect the vertical input across the 600 ohm load on Terminal Board E-101.

2. Connect an audio oscillator to the horizontal input of the oscilloscope.

3. Following the same procedure as described in Section IV-2A, feed a test signal into the HFO INPUT jack (J-101) and tune to obtain a ZERO beat.

4. Vary the D.C. control voltage from +4.5 to -4.5 volts and determine the frequency shift at each extreme as follows; observe the lissajous pattern and vary the audio oscillator frequency until a circle or ellipse is obtained. The frequency read on the audio oscillator is then the frequency shift of the BFO. The resulting shift should not be less than ±2 Kc.

5. If the frequency shift is asymmetrical about the zero voltage center, the reactance tube is unbalanced. Balancing of the reactance tube is accomplished by adjusting the variable resistor R-136, located on the main deck behind L-103.

6. Another method of measuring the frequency shift is to read the audio tone directly on an Audio Frequency Meter.

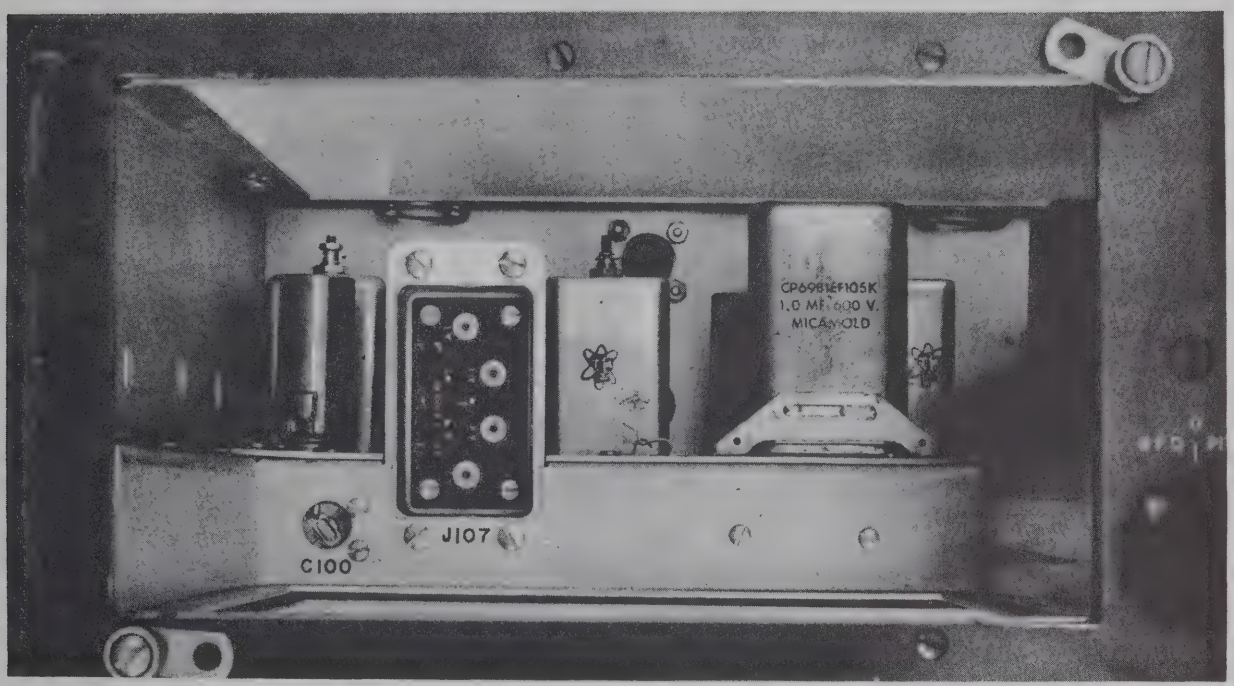
C. THE R.F. HEAD

The following suggested procedure for alignment of the HFO oscillator, R.F. amplifiers, the first detector, and HFO Reactance tube requires an accurate signal generator, a vacuum tube voltmeter, and an LM18 meter. A typical alignment of Band 8 will serve as an example, which can be followed for all the bands included in the Model FFR.

1. After allowing the receiver to warm-up for at least two hours, connect the signal generator with a proper matching resistor to the antenna terminals. The proper matching is done as follows: If the impedance of the signal generator is less than 75 ohms, then the matching resistor required is the difference between 75 ohms and

# ADDENDUM

Relocation of C100, I.F. coupling capacitor on R5007/FRR-502 Receiver Sub Assembly.




As illustrated, C 100 I.F. coupling capacitor has been placed on the rear of the R.F. Tuner wrap around. This makes adjustment possible from the front of the unit, and eliminates the necessity of removing the receiver from the rack. (See page 4-5 for former location.)

REASON: Due to ageing or replacement of vacuum tubes, slight readjustment of C 100 may be necessary to bring the sensitivity of a group of receivers to a uniform level.

PROCEDURE:

1. Remove RF Tuner from the receiver.
2. Connect signal generator to pin A2 of J 107.
3. Connect an AC VTVM to detector terminals 5 and 6 of Terminal Strip E 101 at the rear of the unit.
4. Set receiver controls as follows:
   a. RF GAIN fully clockwise.
   b. AVC MANUAL switch to MANUAL position.
   c. BFO switch to OFF position.
   d. Other controls in any position.
5. Set signal generator frequency to 455.0 kc, output to 115 microvolts, modulated 30 percent at 400 or 1000 cycles.
6. Adjust C 100 with an insulated tuning tool to obtain 1.0 volts A.C. at the detector.
7. If 1.0 volts is not available, the I.F. tubes must be checked for low emission.

PH-703

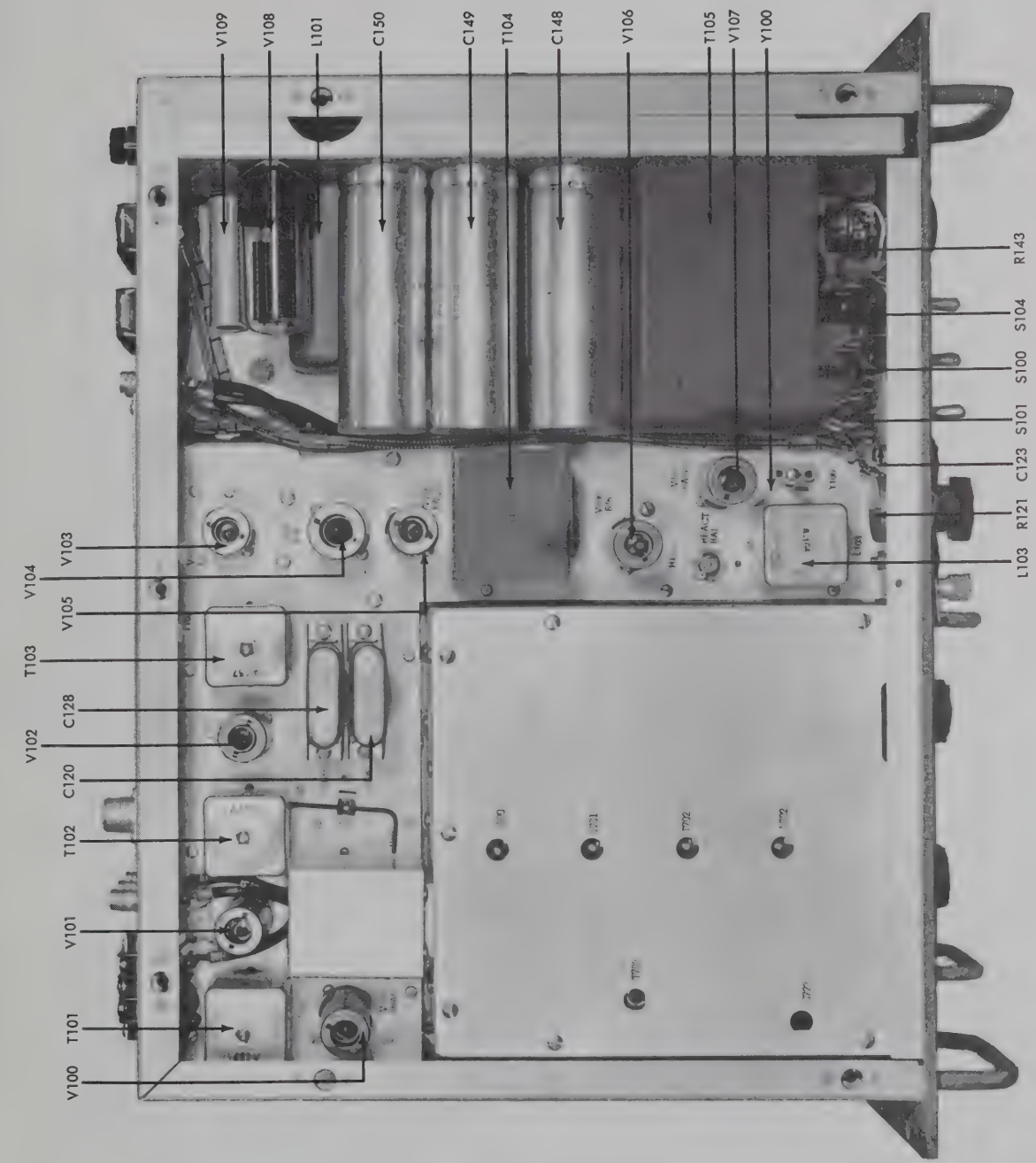



Figure 4-1. Top View, Model FFR with FFRD-* Installed.

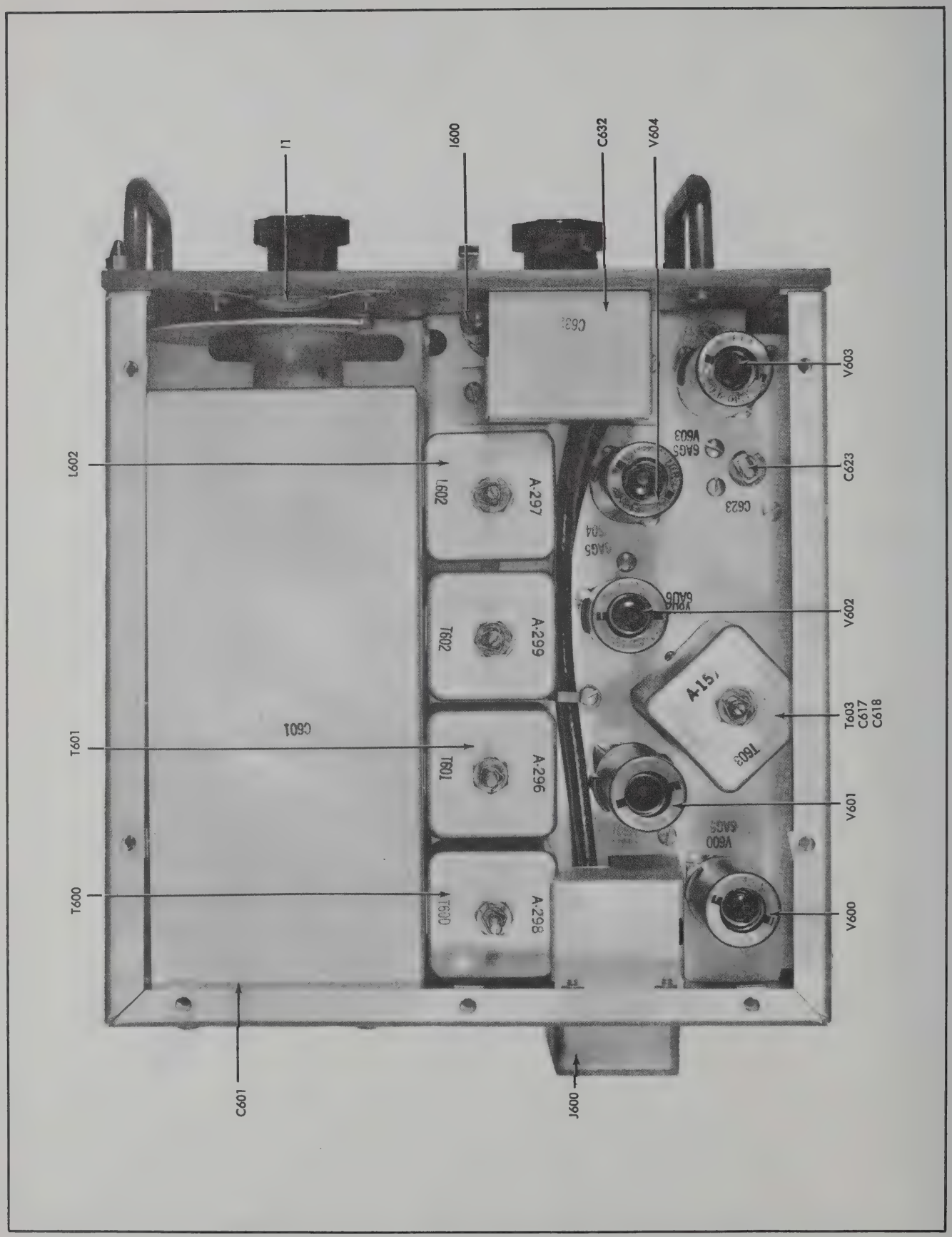



Figure 4-2. Top View, Model FFRD-* (HF Head)

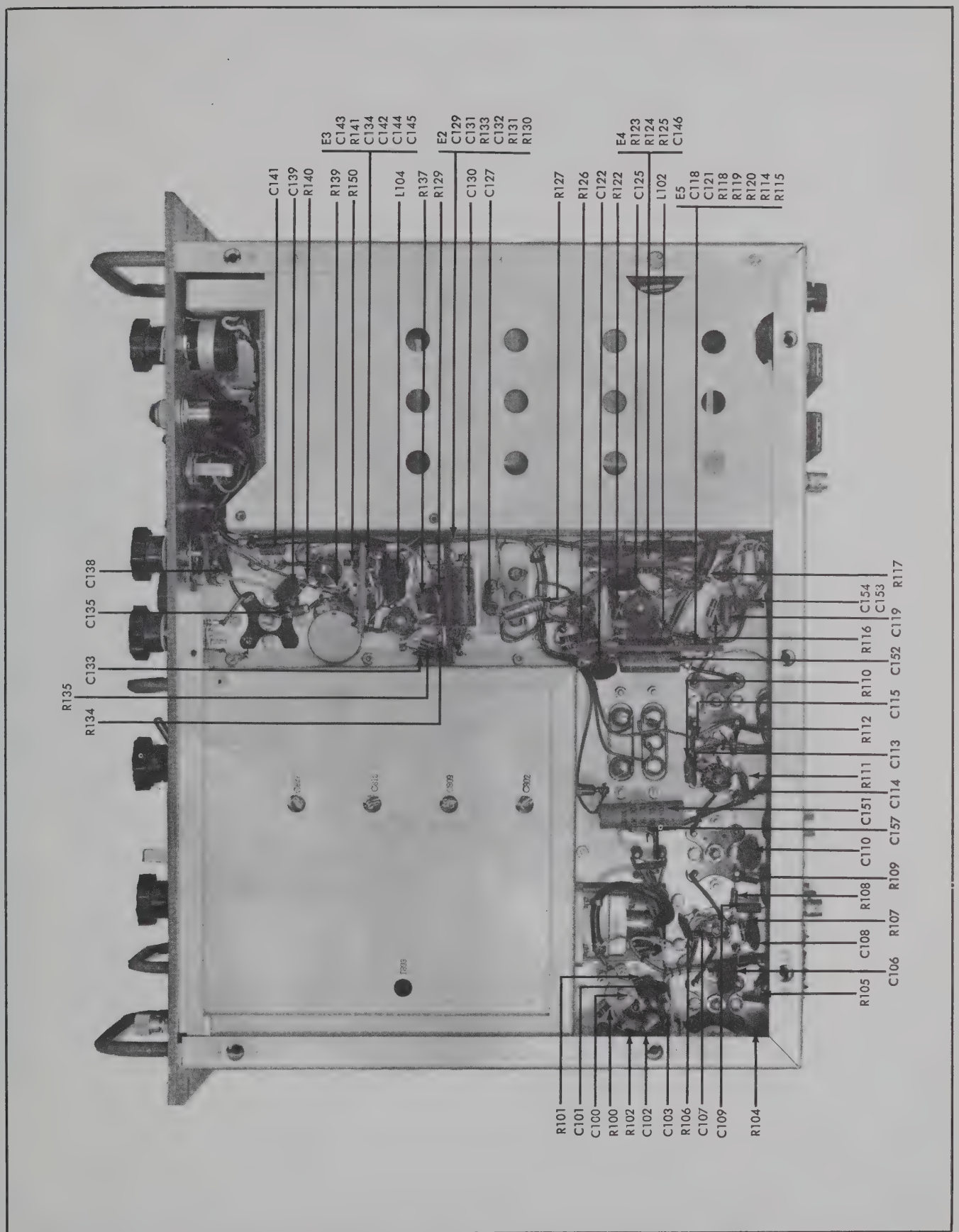



Figure 4-3. Bottom View, Model FFR with FFRD-* Installed.

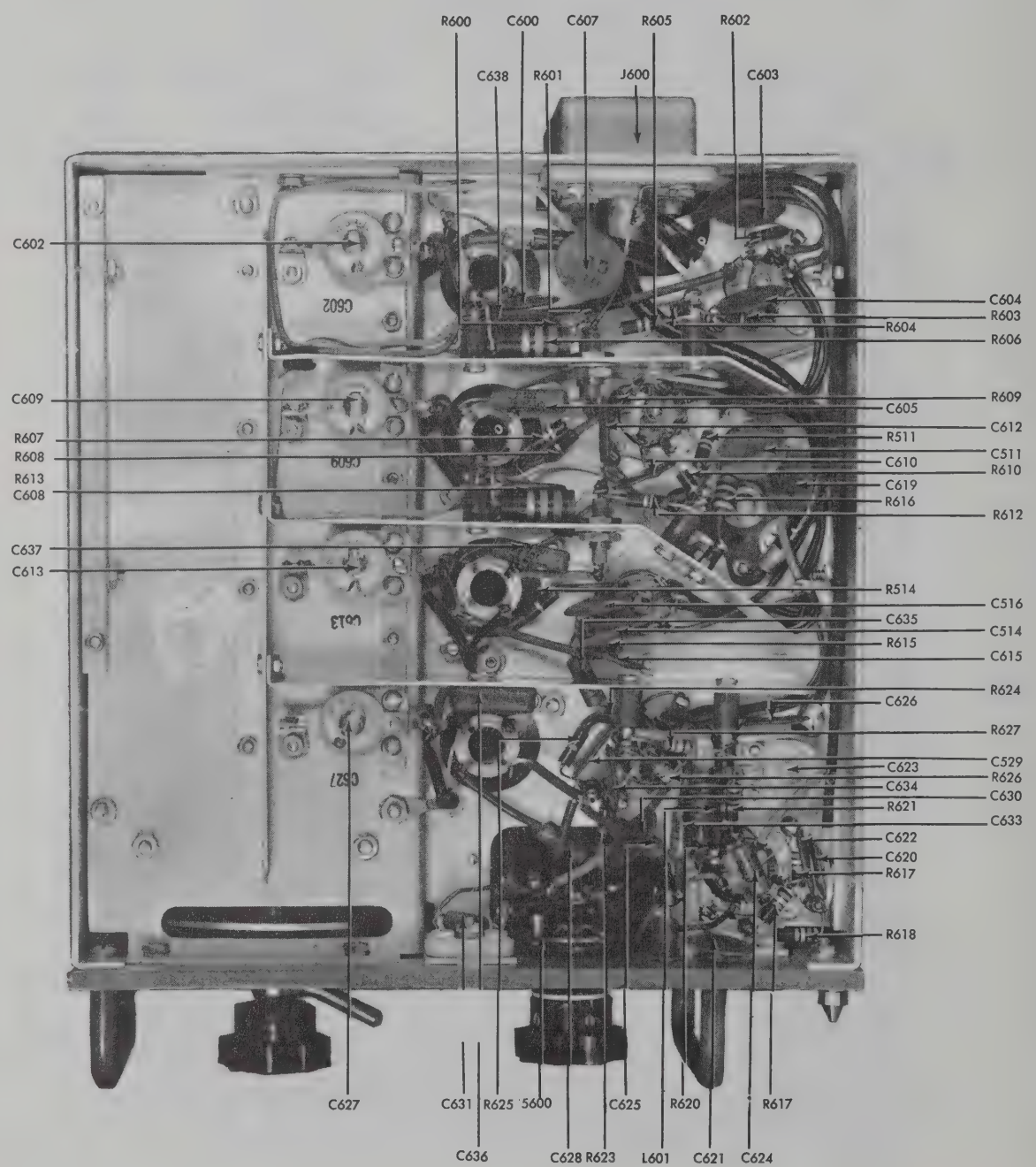



Figure 4-4. Bottom View, Model FFRD-* (HF Head).

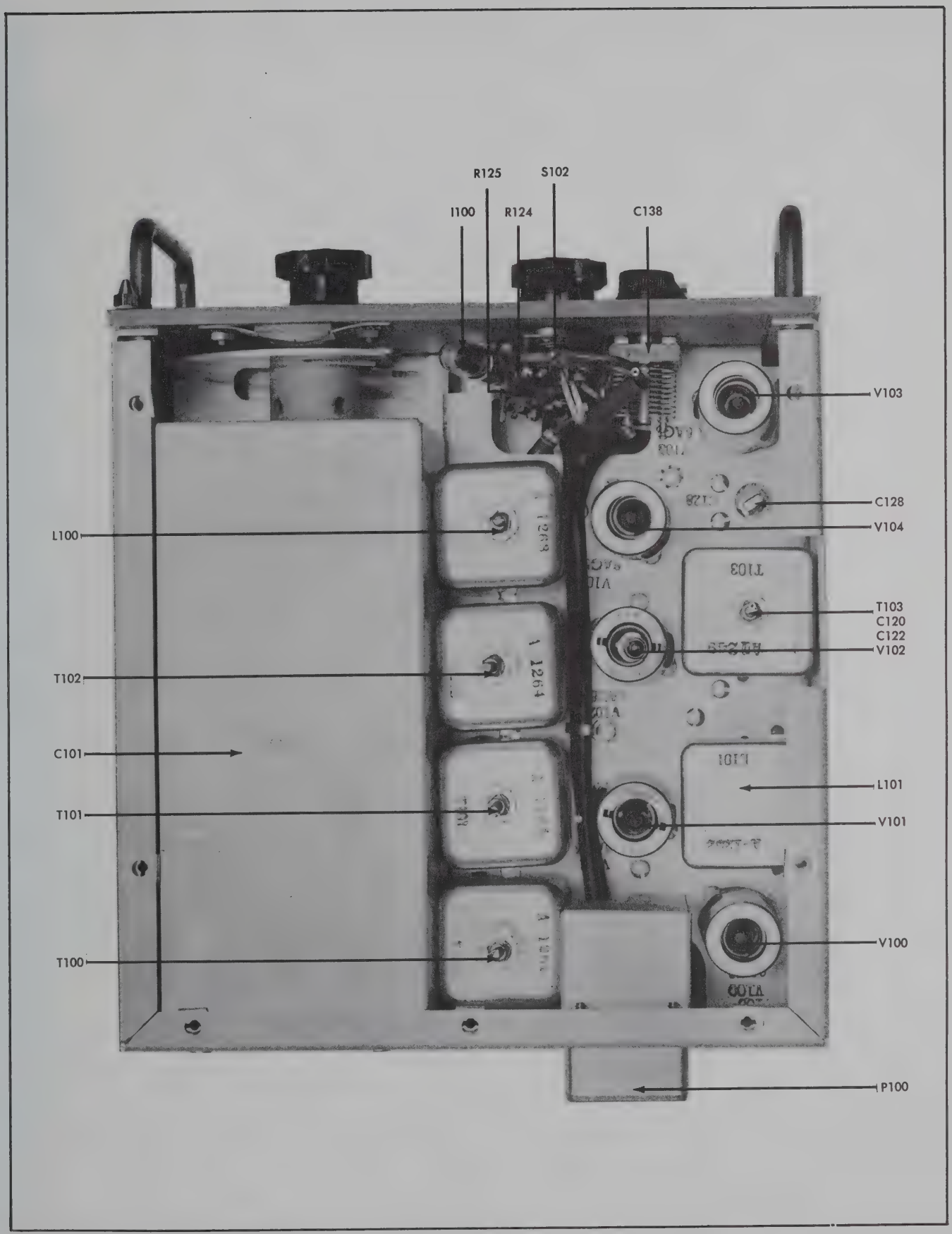



Figure 4-5. Top View Model FFRD-* (LF Head)

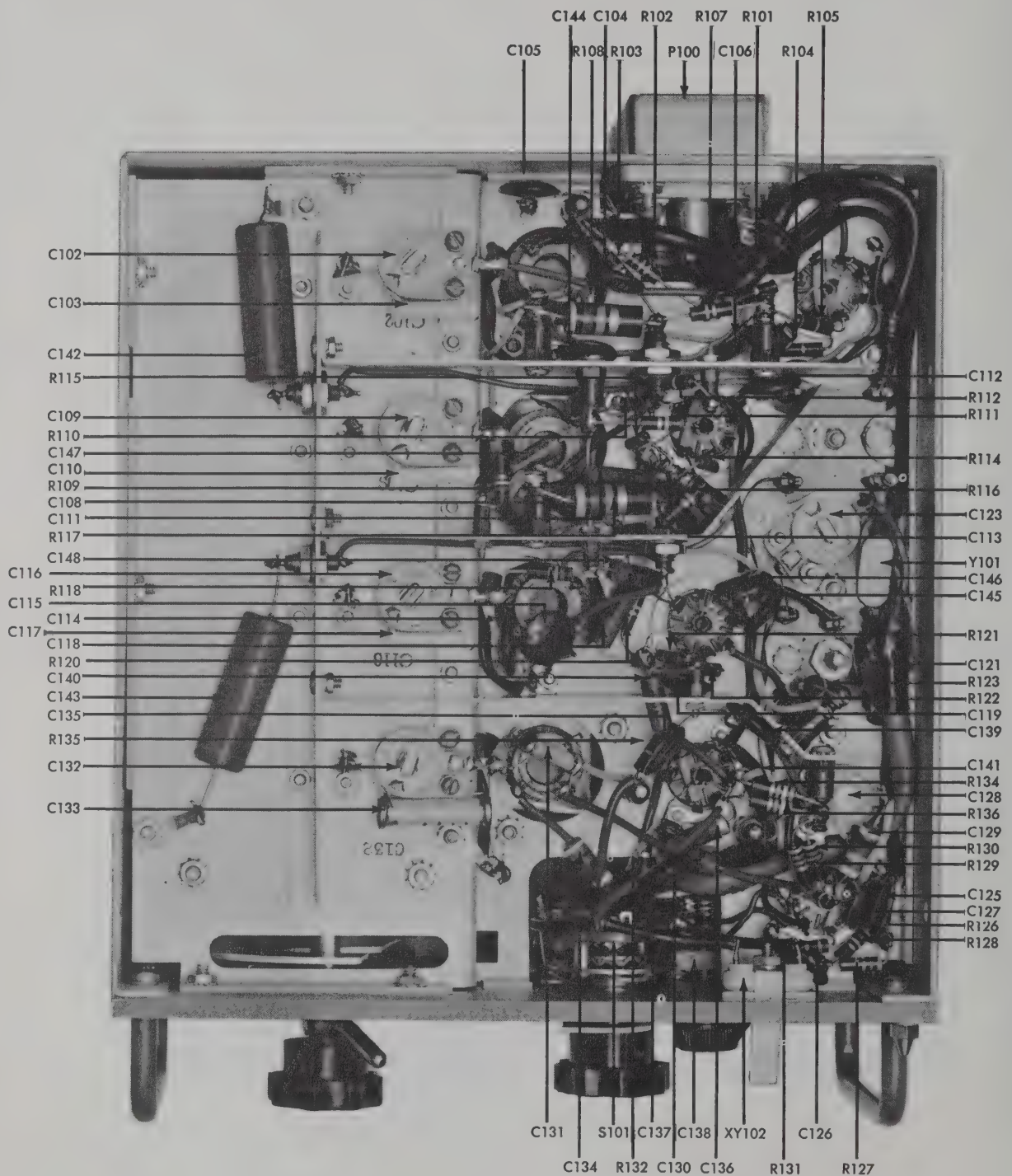



Figure 4-6. Bottom View, Model FFRD-* (LF Head).



PH-565

## TUBE SOCKET VOLTAGES

ALL DC VOLTAGES MEASURED TO CHASSIS WITH AN ELECTRONIC VACUUM TUBE VOLTMETER (WITH TUNING DRAWER IN PLACE). AC VOLTAGES WERE TAKEN WITH SIMPSON MODEL 260 VOLTMETER. FILAMENT VOLTAGES MARKED WITH ASTERISK WERE MEASURED TO THE CORRESPONDING ASTERISK OF THE SAME TUBE SOCKET. HIGH VOLTAGE AC, MARKED WITH A DOUBLE ASTERISK, WAS MEASURED TO THE CHASSIS. LINE VOLTAGE ADJUSTED TO 110 VOLTS.

| CONTROLS | OPERATING POSITION DURING MEASUREMENT |
|---|---|
| HFO (SLAVE-MASTER) SW. | HFO |
| AUDIO GAIN | FULLY CLOCKWISE |
| AVC MANUAL SW. | AVC |
| NOISE LIMITER SW. | ON |
| BFO SW. | ON |
| BFO (SLAVE-MASTER) SW. | BFO |
| RF GAIN | FULLY CLOCKWISE |

### MODEL FFR-2 RECEIVER

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | | 3 | | 4 | | 5 | | 6 | 7 | 8 | | 9 |
| | | | | DC | AC | DC | AC | DC | AC | DC | AC | | | DC | AC | |
| V100 | 6BA6 | 1ST I.F. AMP. | -0.18 | +1.30 | — | +6.3 | 6.2* | +6.3 | 6.2* | +250 | — | +70 | +1.30 | — | — | — |
| V101 | 6BA6 | 2ND I.F. AMP. | -0.18 | +1.25 | — | +6.3 | 6.2* | +6.3 | 6.2* | +250 | — | +65 | +1.25 | — | — | — |
| V102 | 6BA6 | 3RD I.F. AMP. | 0 | +1.40 | — | +6.3 | 6.2* | +6.3 | 6.2* | +250 | — | +70 | +1.40 | — | — | — |
| V103 | 6AL5 | 2ND DET. & AVC | 0 | -0.1 | — | +6.3 | 6.2* | +6.3 | 6.2* | +3.6 | — | 0 | -1.5 | — | — | — |
| V104 | 6T8 | NOISE LIMITER & 1ST AUDIO | NC | -2.0 | — | -1.3 | — | +6.3 | 6.2* | +6.3 | 6.2* | NC | +1.5 | 0 | — | +125 |
| V105 | 6AQ5 | AUDIO | 0 | +16.0 | — | +6.3 | 6.2* | +6.3 | 6.2* | +250 | — | +250 | 0 | — | — | — |
| V106 | 6J6 | BFO REACT. MOD. | +47 | +49 | — | +6.3 | 6.2* | +6.3 | 6.2* | 0 | — | 0 | +1.6 | — | — | — |
| V107 | 6AG5 | BFO OSC. | +3.0 | +0.4 | — | +6.3 | 6.2* | +6.3 | 6.2* | +150 | — | +70 | +0.4 | — | — | — |
| V108 | 5Y3GT | RECT. | — | 290 | 5.2* | — | — | — | 360** | — | — | 360** | — | 290 | 5.2* | — |
| V109 | 0A2 | VOLTAGE REG | +150 | — | — | — | — | — | — | +150 | — | — | — | — | — | — |

CH-138-5

### FFRD-5A TUNING DRAWER
TUNING CONTROL AT 2 MCS

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | | 4 | | 5 | 6 | 7 |
| | | | | | DC | AC | DC | AC | | | |
| V500 | 6AG5 | 1ST RF | -0.2 | +0.83 | +6.3 | 6.0* | +6.3 | 6.0* | +150 | +60 | +0.83 |
| V501 | 6AG5 | 2ND RF | -0.2 | +0.76 | +6.3 | 6.0* | +6.3 | 6.0* | +150 | +60 | +0.76 |
| V502 | 6AU6 | MIXER | 0 | — | +6.3 | 6.0* | +6.3 | 6.0* | +112 | +112 | +2.0 |
| V503 | 6AG5 | HFO. REACT. MOD. | 0 | +4.6 | +6.3 | 6.0* | +6.3 | 6.0* | +145 | +145 | +4.6 |
| V504 | 6AG5 | HFO OSC. | -2.5 | +0.5 | +6.3 | 6.0* | +6.3 | 6.0* | +53 | +90 | +0.5 |

CH-138-1

### FFRD-7A TUNING DRAWER
TUNING CONTROL AT 8 MCS.

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | | 4 | | 5 | 6 | 7 |
| | | | | | DC | AC | DC | AC | | | |
| V700 | 6AG5 | 1ST RF | -0.2 | +0.7 | +6.3 | 6.0* | +6.3 | 6.0* | +150 | +60 | +0.7 |
| V701 | 6AG5 | 2ND RF | -0.2 | +0.7 | +6.3 | 6.0* | +6.3 | 6.0* | +150 | +64 | +0.7 |
| V702 | 6AU6 | MIXER | 0 | +2.6 | +6.3 | 6.0* | +6.3 | 6.0* | +115 | +115 | +2.6 |
| V703 | 6AG5 | HFO REACT. MOD. | 0 | +4.6 | +6.3 | 6.0* | +6.3 | 6.0* | +145 | +135 | +4.6 |
| V704 | 6AG5 | HFO OSC. | -3.6 | +0.5 | +6.3 | 6.0* | +6.3 | 6.0* | +68 | +90 | +0.5 |

CH-138-3

### FFRD-6A TUNING DRAWER
TUNING CONTROL AT 4 MCS

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | | 4 | | 5 | 6 | 7 |
| | | | | | DC | AC | DC | AC | | | |
| V600 | 6AG5 | 1ST RF | -0.2 | +0.70 | +6.3 | 6.0* | +6.3 | 6.0* | +160 | +60 | +0.70 |
| V601 | 6AG5 | 2ND RF | -0.2 | +0.80 | +6.3 | 6.0* | +6.3 | 6.0* | +150 | +60 | +0.80 |
| V602 | 6AU6 | MIXER | 0 | — | +6.3 | 6.0* | +6.3 | 6.0* | +108 | +108 | +2.0 |
| V603 | 6AG5 | HFO REACT. MOD. | 0 | +3.8 | +6.3 | 6.0* | +6.3 | 6.0* | +145 | +135 | +3.8 |
| V604 | 6AG5 | HFO OSC | -1.8 | +0.5 | +6.3 | 6.0* | +6.3 | 6.0* | +47 | +92 | +0.5 |

CH-138-2

### FFRD-8A TUNING DRAWER
TUNING CONTROL AT 16 MCS

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | | 4 | | 5 | 6 | 7 |
| | | | | | DC | AC | DC | AC | | | |
| V800 | 6AK5 | 1ST RF | -0.1 | +0.7 | +6.3 | 6.0 | +6.3 | 6.0 | +150 | +58 | +0.7 |
| V801 | 6AK5 | 2ND RF | -0.1 | +0.8 | +6.3 | 6.0 | +6.3 | 6.0 | +150 | +58 | +0.8 |
| V802 | 6AU6 | MIXER | 0 | +2.5 | +6.3 | 6.0 | +6.3 | 6.0 | +110 | +110 | +2.5 |
| V803 | 6AG5 | HFO REACT. MOD. | 0 | +3.3 | +6.3 | 6.0 | +6.3 | 6.0 | +150 | +130 | +3.3 |
| V804 | 6AK5 | HFO OSC. | -0.75 | +1.1 | +6.3 | 6.0 | +6.3 | 6.0 | +150 | +112 | +1.1 |

CH-138-4

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Figure 4-7a. Tube Socket Voltages, FFR Receiver., FFRD-5,6, 7 and 8

## TUBE SOCKET RESISTANCES

RESISTANCE MEASURED FROM TUBE SOCKET PINS TO GROUND. LINE CORD DISCONNECTED FROM POWER SOURCE AND TUNING DRAWER PLUGGED INTO RECEIVER. OPERATING CONTROLS WERE SET AS FOLLOWS:

| CONTROL | POSITION |
|---|---|
| HFO (SLAVE—MASTER) SW. | HFO |
| AUDIO GAIN | FULLY CLOCKWISE |
| AVC - MANUAL SW. | AVC |
| NOISE LIMITER SW. | ON |
| BFO SW. | ON |
| BFO (SLAVE—MASTER) SW. | BFO |
| RF GAIN | FULLY CLOCKWISE |

### MODEL FFR-2 RECEIVER

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| V100 | 6BA6 | 1ST IF AMP | 1.7M | 220Ω | 6.8K | 6.8K | 32K | 50K | 220Ω | — | — |
| V101 | 6BA6 | 2ND IF AMP | 1.5M | 220Ω | 6.8K | 6.8K | 32K | 50K | 220Ω | — | — |
| V102 | 6BA6 | 3RD IF AMP | 5Ω | 220Ω | 6.8K | 6.8K | 32K | 50K | 220Ω | — | — |
| V103 | 6AL5 | 2ND DET. & AVC | 0 | 1.2M | 6.8K | 6.8K | 6.8K | 0 | 520K | — | — |
| V104 | 6T8 | NOISE LIMITER & 1ST AUDIO | — | 1.0M | 470K | 6.8K | 6.8K | — | 2.7K | 1.0M | 225K |
| V105 | 6AQ5 | AUDIO | 470K | 510Ω | 6.8K | 6.8K | 32K | 32K | — | — | — |
| V106 | 6J6 | BFO REACT. MOD. | 95K | 95K | 6.8K | 6.8K | 33K | 590K | 1.0K | — | — |
| V107 | 6AG5 | BFO OSC. | 47K | 120Ω | 6.8K | 6.8K | 37K | 150K | 120Ω | — | — |
| V108 | 5Y3GT | RECTIFIER | — | 32K | — | 730Ω | — | 750Ω | — | 32K | — |
| V109 | 0A2 | VOLTAGE REG. | 32K | — | — | — | 32K | — | — | — | — |

CH-137-6

NOTE: K = 1000 Ω
M = 1 MEGOHM

### FFRD-5A TUNING DRAWER

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| V500 | 6AG5 | 1ST RF AMP | 1.5M | 220Ω | 6.8K | 6.8K | 48K | 90K | 220Ω |
| V501 | 6AG5 | 2ND RF AMP | 1.5M | 220Ω | 6.8K | 6.8K | 48K | 90K | 220Ω |
| V502 | 6AU6 | MIXER | 10Ω | 0 | 6.8K | 6.8K | 78K | 78K | 820Ω |
| V503 | 6AG5 | HFO REACT. MOD. | 1.4M | 2.7K | 6.8K | 6.8K | 26K | 73K | 2.7K |
| V504 | 6AG5 | HFO OSC. | 22K | 120Ω | 6.8K | 6.8K | 68K | 68K | 120Ω |

CH-137-1

### FFRD-7A TUNING DRAWER

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| V700 | 6AG5 | 1ST RF AMP | 1.5M | 220Ω | 6.8K | 6.8K | 45K | 93K | 220Ω |
| V701 | 6AG5 | 2ND RF AMP | 1.5M | 220Ω | 6.8K | 6.8K | 45K | 93K | 220Ω |
| V702 | 6AU6 | MIXER | 0 | 950Ω | 6.8K | 6.8K | 75K | 75K | 950Ω |
| V703 | 6AG5 | HFO REACT MOD | 1.4M | 3.3K | 6.8K | 6.8K | 52K | 68K | 3.3K |
| V704 | 6AG5 | HFO OSC. | 22K | 120Ω | 6.8K | 6.8K | 66K | 66K | 120Ω |

CH-137-3

### FFRD-6A TUNING DRAWER

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| V600 | 6AG5 | 1ST RF AMP | 1.5M | 220Ω | 6.8K | 6.8K | 50K | 95K | 220Ω |
| V601 | 6AG5 | 2ND RF AMP | 1.5M | 220Ω | 6.8K | 6.8K | 50K | 95K | 220Ω |
| V602 | 6AU6 | MIXER | 10Ω | 0 | 6.8K | 6.8K | 80K | 80K | 820Ω |
| V603 | 6AG5 | HFO REACT. MOD. | 1.4M | 3.3K | 6.8K | 6.8K | 27K | 75K | 3.3K |
| V604 | 6AG5 | HFO OSC. | 22K | 120Ω | 6.8K | 6.8K | 70K | 70K | 120Ω |

CH-137-2

### FFRD-8A TUNING DRAWER

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| V800 | 6AK5 | 1ST RF AMP | 1.5M | 220Ω | 6.8K | 6.8K | 50K | 94K | 220Ω |
| V801 | 6AK5 | 2ND RF AMP | 1.5M | 220Ω | 6.8K | 6.8K | 50K | 94K | 220Ω |
| V802 | 6AU6 | MIXER | 5Ω | 950Ω | 6.8K | 6.8K | 80K | 80K | 950Ω |
| V803 | 6AG5 | HFO REACT. MOD. | 1.5M | 1.5K | 6.8K | 6.8K | 50K | 75K | 1.5K |
| V804 | 6AK5 | HFO OSC | 22K | 120Ω | 6.8K | 6.8K | 27K | 50K | 120Ω |

CH-137-4

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Figure 4-7b. Tube Socket Resistances, FFR Receiver, FFRD-5, 6, 7 and 8.

TUNING DRAWER VOLTAGES

FFRD-1,2,3 TUNING DRAWERS
TUNING CONTROL AT 75KCS, 150 KCS, 300 KCS

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | | 4 | | 5 | 6 | 7 |
| | | | | | DC | AC | DC | AC | | | |
| V100 | 6AG5 | 1ST RF AMP | -0.2 | +0.6 | +6.3 | 6.0* | +6.3 | 6.0* | +130 | +50 | +0.6 |
| V101 | 6AG5 | 2ND RF AMP | -0.2 | +0.6 | +6.3 | 6.0* | +6.3 | 6.0* | +130 | +50 | +0.6 |
| V102 | 6AU6 | MIXER | 0 | 0 | +6.3 | 6.0* | +6.3 | 6.0* | +240 | +240 | +9.0 |
| V103 | 6AG5 | HFO REACT MOD | 0 | +3.5 | +6.3 | 6.0* | +6.3 | 6.0* | +100 | +130 | +3.5 |
| V104 | 6AG5 | HFO OSC | -7.0 | +0.5 | +6.3 | 6.0* | +6.3 | 6.0* | +85 | +75 | +0.5 |

TUBE NUMBERS ARE KEYED TO BAND 1.

GN-151-1

FFRD-3M TUNING DRAWER
TUNING CONTROL AT 500 KCS

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | | 4 | | 5 | 6 | 7 |
| | | | | | DC | AC | DC | AC | | | |
| V1 | 6AG5 | 1ST RF AMP | -0.2 | +1.2 | +6.3 | 6.0* | +6.3 | 6.0* | +250 | +100 | +1.2 |
| V2 | 6AG5 | 2ND RF AMP | -0.2 | +1.2 | +6.3 | 6.0* | +6.3 | 6.0* | +250 | +100 | +1.2 |
| V3 | 6AU6 | MIXER | 0 | 0 | +6.3 | 6.0* | +6.3 | 6.0* | +250 | +250 | +9.0 |
| V4 | 6AG5 | HFO REACT MOD | 0 | +5.3 | +6.3 | 6.0* | +6.3 | 6.0* | +75 | +130 | +5.3 |
| V5 | 6AG5 | HFO OSC | -3.0 | +0.5 | +6.3 | 6.0* | +6.3 | 6.0* | +65 | +80 | +0.5 |

GN-151-2

ALL NOTES ON PAGE 4-7 ARE APPLICABLE TO THE ABOVE CHARTS.

TUNING DRAWER 'STANCES

FFRD-1,2,3 TUNING DRAWERS

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| V100 | 6AG5 | 1ST RF AMP | 2M | 220Ω | 6.8K | 6.8K | 55K | 100K | 220Ω |
| V101 | 6AG5 | 2ND RF AMP | 1.5M x | 220Ω | 6.8K | 6.8K | 55K | 100K | 220Ω |
| V102 | 6AU6 | MIXER | 100K | 0 | 6.8K | 6.8K | 70K | 70K | 24K |
| V103 | 6AG5 | HFO REACT MOD | 1.5M | 2.7K | 6.8K | 6.8K | 70K | 70K | 2.7K |
| V104 | 6AG5 | HFO OSC | 22K | 120Ω | 6.8K | 6.8K | 60K | 60K | 120Ω |

TUBE NUMBERS ARE KEYED TO BAND 1.

GN-151-3

FFRD-3M TUNING DRAWER

| TUBE | TYPE | FUNCTION | SOCKET PIN NUMBERS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| V1 | 6AG5 | 1ST RF AMP | 2M | 220Ω | 6.8K | 6.8K | 28K | 82K | 220Ω |
| V2 | 6AG5 | 2ND RF AMP | 2M | 220Ω | 6.8K | 6.8K | 28K | 82K | 220Ω |
| V3 | 6AU6 | MIXER | 3Ω | 0 | 6.8K | 6.8K | 68K | 68K | 24K |
| V4 | 6AG5 | HFO REACT MOD | 1.4M | 2.7K | 6.8K | 6.8K | 65K | 75K | 2.7K |
| V5 | 6AG5 | HFO OSC | 22K | 120Ω | 6.8K | 6.8K | 60K | 60K | 120Ω |

GN-151-4

x ON THE FFRD-3 ONLY, THIS READING IS 2M.

ALL NOTES ON PAGE 4-8 ARE APPLICABLE TO THE ABOVE CHARTS.

Figure 4-7c. Tube Socket Resistance and Voltages, FFRD-1, 2, 3 and 3M.

## TABLE 4-1. RF AND HFO ALIGNMENT CHART

| BAND | | OSC. | MIXER | R.F. | ANT. |
|---|---|---|---|---|---|
| 8 | LOW END | 16.0 Mc | 16.0 Mc | 16.0 Mc | 16.0 Mc |
| | HIGH END | 31.0 Mc | 31.0 Mc | 31.0 Mc | 31.0 Mc |
| 7 | LOW END | 8.0 Mc | 8.5 Mc | 8.5 Mc | 8.5 Mc |
| | HIGH END | 16.0 Mc | 16.0 Mc | 16.0 Mc | 16.0 Mc |
| 6 | LOW END | 4.0 Mc | 4.25 Mc | 4.25 Mc | 4.25 Mc |
| | HIGH END | 8.0 Mc | 8.0 Mc | 8.0 Mc | 8.0 Mc |
| 5 | LOW END | 2.0 Mc | 2.1 Mc | 2.1 Mc | 2.1 Mc |
| | HIGH END | 4.0 Mc | 4.0 Mc | 4.0 Mc | 4.0 Mc |
| 3M | LOW END | 185 Kc | 185 Kc | 185 Kc | 185 Kc |
| | HIGH END | 215 Kc | 215 Kc | 215 Kc | 215 Kc |
| 3 | LOW END | 655 Kc | 200 Kc | 200 Kc | 200 Kc |
| | HIGH END | 855 Kc | 400 Kc | 400 Kc | 400 Kc |
| 2 | LOW END | 555 Kc | 100 Kc | 100 Kc | 100 Kc |
| | HIGH END | 655 Kc | 200 Kc | 200 Kc | 200 Kc |
| 1 | LOW END | 405 Kc | 50 Kc | 50 Kc | 50 Kc |
| | HIGH END | 555 Kc | 100 Kc | 100 Kc | 100 Kc |

## TABLE 4-2 HFO REACTANCE SHIFT CHART

| TUNING DRAWER | | | | TUNING DRAWER | | | |
|---|---|---|---|---|---|---|---|
| No. | Total Freq. Shift/Mc | Freq. | Total Shift | No. | Total Freq. Shift/Mc | Freq. | Total Shift |
| 5 | 4 Kc/Mc | 2 Mc | 8 Kc | 7 | 3 Kc/Mc | 8 Mc | 24 Kc |
| | | 3 Mc | 12 Kc | | | 12 Mc | 36 Kc |
| | | 4 Mc | 16 Kc | | | 16 Mc | 48 Kc |
| 6 | 4 Kc/Mc | 4 Mc | 16 Kc | 8 | Min. Shift of 32 Kc Throughout The Band | 16 Mc | 32 Kc |
| | | 6 Mc | 24 Kc | | | 24 Mc | 32 Kc |
| | | 8 Mc | 32 Kc | | | 31 Mc | 32 Kc |
| 1 | Min. Shift of 4 Kc Throughout The Band | 50 Mc | 4.0 Kc | 3 | Min. Shift of 4 Kc Throughout The Band | 200 Kc | 4.0 Kc |
| | | 75 Mc | 4.0 Kc | | | 300 Kc | 4.0 Kc |
| | | 100 Mc | 4.0 Kc | | | 400 Kc | 4.0 Kc |
| 2 | do | 100 Kc | 4.0 Kc | 3M | do | 500 Kc | 6 Kc |
| | | 150 Kc | 4.0 Kc | | | | |
| | | 200 Kc | 4.0 Kc | | | | |

the signal generator impedance. The generator should be modulated 30% at 1000 cycles.

2. Place a high impedance vacuum tube voltmeter across a 600 ohm load at the proper load terminals.

3. Plug a set of headphones into the PHONE jack, if desired.

4. Set the BFO to "Off", the LIMITER to "Off", the R.F. GAIN full, the HFO MASTER-SLAVE switch to HFO, and adjust the A.F. GAIN to an output of 20 volts on the meter.

5. Set the signal generator and the Model FFR dials to 32 Mcs.

The HFO is set to operate at a frequency above the first detector and R.F. amplifiers and not below. The fundamental-image relationship of this receiver is such that the signal image frequency always appears 910 kcs. higher on the dial of the signal generator (or 910 kcs. lower on the receiver dial). Referring to the oscillator trimmer C-827, starting from the maximum capacity setting in clockwise rotation, two distinct peaks will be obtained. After one of the peaks has been tuned in and assumed to be correct, the signal generator dial is tuned from 31 Mc. to 31.91 Mc. If a signal appears on this new setting, then the peak setting of the trimmer is correct. If the wrong peak was chosen, the operator should tune the trimmer to its adjacent peak and recheck the 31.91 Mc point on the signal generator. In all cases when checking the image frequency, the signal generator output should be increased because of pre-selector discrimination against image frequencies.

The next step is to set the signal generator and the FFR dial to 31 Mcs and peak the MIXER, RF, and ANTENNA trimmers C-813, C-809, C-802 in that order. When adjusting the MIXER trimmer, the signal generator should be reset slightly because of the pulling effect of the MIXER on the HFO oscillator. At the lower frequency heads, the MIXER trimmer may have two peak settings. One of these is due to the MIXER being tuned to the frequency of the HFO oscillator, resulting in great oscillator injection voltage, thus giving an apparent indication of correct alignment. However, this is the wrong setting. The correct setting is the one with maximum trimmer capacity.

Then, tune the signal generator and the FFR dial to 16 Mcs. Turn the trimmer "slug"

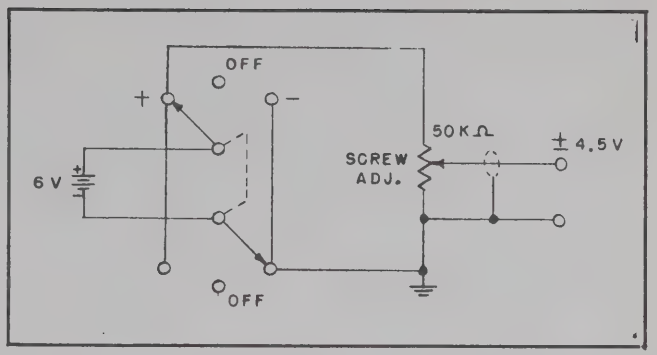



Figure 4-8. Reactance Tube Control Voltage.

of the HFO oscillator until an indication is noticed in the voltmeter. Check for its image at the 16.91 Mcs. setting on the signal generator, at the same time increasing the attenuating control on the signal generator. Once the correct peak setting of the slug is chosen, set the signal generator and the FFR dial to 16 Mcs. and peak the MIXER, RF, and ANTENNA "Slugs" in that order. Again, the operator must remember to retune slightly the dial of the signal generator because of the slight pulling effect of the MIXER on the HFO oscillator. Then, return the dial settings of the signal generator and the FFR to 31 Mcs. and repeat the procedure.

Table 4-1 gives a list of the frequency settings to be followed for the alignment of all the bands in the Model FFR. Using the frequencies shown in this table, align the bands in the same procedure as described above.

## D. THE HFO REACTANCE TUBE

It is recommended that the HFO Reactance Tube be adjusted in the center band. Set a standard crystal in the BFO circuit, and "Zero-beat" an unmodulated 24 Mcs. signal from an LM18 or a BC-221 frequency meter connected into the antenna with a ±4.5 v.D.C. signal connected to the HFO EXTERNAL terminal on E-102. Note the amount of shift on the frequency meter when the "zero-beat" has been established. Then trim C-823 to give a maximum shift when the ±4.5 D.C. voltage has been applied to the reactance tube input. A suggested circuit for the varying and controlling of a ±6 v.D.C. source in the BFO and HFO Reactance Tube alignment is shown in Figure 4-6. Then repeat the procedure for aligning the R.F. Head.

## 3. ELECTRICAL PARTS LIST

R-5007/FRR-502

COMMUNICATION RECEIVER, MODEL FFR

THE BASIC RECEIVER CHASSIS IS SYMBOLIZED WITH SERIES 100 THROUGH 199 NUMBERS.

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C100 | CAPACITOR, variable: ceramic, 4-30 mmfd, 500 wvdc. | IF Coupling | CV11C300 |
| C101 | CAPACITOR, fixed: ceramic; .01 mfd. (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C102 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C103 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate decoupling | CC-100-16 |
| C104 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF tank | CM20D621G |
| C105 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF tank | CM20D621G |
| C106 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C107 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C108 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C109 | CAPACITOR, fixed: ceramic; 15 mmfd, ±5%, 500 wvdc. | IF output | CC21SL150J |
| C110 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C111 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF tank | CM20D621G |
| C112 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF tank | CM20D621G |
| C113 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C114 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C115 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate decoupling | CC-100-16 |
| C116 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF tank | CM20D621G |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C117 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF tank | CM20D621G |
| C118 | CAPACITOR, fixed: ceramic; 100 mmfd, ±10%, 500 wvdc. | IF Bypass | CC26SL101K |
| C119 | CAPACITOR, fixed: ceramic; 51 mmfd, ±5%, 500 wvdc. | Det-AVC Coupling | CC21SL510J |
| C120A B | CAPACITOR, fixed: paper, dual unit, .5 mfd, ±15%, ea sect, 600 wvdc, oil filled and impregnated, hermetically sealed metal case. | Filter capacitor | CP69B4EF504L |
| C121 | CAPACITOR, fixed: ceramic; 100 mmfd, ±10%, 500 wvdc. | IF Bypass | CC26SL101K |
| C122 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Audio Coupling | CC-100-16 |
| C123 | CAPACITOR, fixed: paper; .05 mfd, +40, -20%, 400 wvdc, plastic tubular case. | Noise Limiter time constant | CN-100-3 |
| C124 | Not used. | | |
| C125 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Audio Coupling | CC-100-16 |
| C126 | Not Used. | | |
| C127 | CAPACITOR, fixed: ceramic; .005 mfd, (GMC), 500 wvdc, disc type. | Audio Bypass | CC-100-15 |
| C128 | CAPACITOR, fixed: paper; 1 mfd, ±15%, 600 wvdc, oil-filled and impregnated, hermetically sealed case. | Audio Filter | CP69B1EF105L |
| C129 | CAPACITOR, fixed: paper; .05 mfd, +40, -20%, 400 wvdc, plastic tubular case. | Reactance tube Grid | CN-100-3 |
| C130 | CAPACITOR, fixed: paper; .05 mfd, +40, -20%, 400 wvdc, plastic tubular case. | Reactance tube Grid Filter | CN-100-3 |
| C131 | CAPACITOR, fixed: ceramic; 22 mmfd, ±5%, 500 wvdc. | Reactance tube Phase Network | CC21SL220J |
| C132 | CAPACITOR, fixed: ceramic; 1,000 mmfd, ±20%, char. A, 500 wvdc, disc type. | Blocking | CC-100-9 |
| C133 | CAPACITOR, fixed: ceramic; .005 mfd, (GMC), 500 wvdc, disc type. | Reactance tube cathode bypass | CC-100-15 |
| C134 | CAPACITOR, fixed: ceramic; 220 mmfd, ±10%, 500 wvdc. | P/O Output Tank | CC-101-3 |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C135 | CAPACITOR, fixed: ceramic; 150 mmfd, ±10%, 500 wvdc. | Reactance tube Coupling | CC-101-2 |
| C136 | CAPACITOR, fixed: mica; 510 mmfd, ±2%, char. C, 500 wvdc. | Part of BFO tank | CM20C511G |
| C137 | CAPACITOR, variable: air 2.3 to 15 mmfd. | BFO Pitch | CT-104-2 |
| C138 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | BFO Grid Coupling | CC21SL470K |
| C139 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | BFO Cathode Bypass | CC-100-16 |
| C140 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | BFO Screen Bypass | CC-100-16 |
| C141 | CAPACITOR, fixed: ceramic; 30 mmfd, ±5%, 500 wvdc. | Xtal BFO Grid Bypass | CC21SL300J |
| C142 | CAPACITOR, fixed: ceramic; 150 mmfd, ±5%, 500 wvdc. | RF Screen Bypass | CC-101-2 |
| C143 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | RF Bypass | CC-100-16 |
| C144 | CAPACITOR, fixed: ceramic; 10 mmfd, ±.5 mmfd, 500 wvdc. | BFO Injection | CC21SL100D |
| C145 | CAPACITOR, fixed: ceramic; 5mmfd, ±.5 mmfd, 500 wvdc. | BFO Output | CC21SL050D |
| C146 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | AVC time constant | CC-100-16 |
| C147 A&B | CAPACITOR, fixed: paper; dual unit, .1 mfd, ±10% ea. section, 600 wvdc, oil filled and impregnated, hermetically sealed metal case. | Line Bypass | CP53B4EF104K |
| C148 | CAPACITOR, fixed: paper; 4.0 mfd, +20%, -10%, 600 wvdc, oil filled and impregnated, hermetically sealed metal case. | Power Supply Filter | CP41B1FF405V |
| C149 | CAPACITOR, fixed: paper; 4.0 mfd, +20%, -10%, 600 wvdc, oil filled and impregnated, hermetically sealed metal case. | Power Supply Filter | CP41B1FF405V |
| C150 | CAPACITOR, fixed: paper; 4.0 mfd, +20%, -10%, 600 wvdc, oil filled and impregnated, hermetically sealed metal case. | Power Supply Filter | CP41B1FF405V |
| C151 | CAPACITOR, fixed: electrolytic; 25 mfd, ±10%, 150 wvdc. | Negative Supply Filter | CE-100 |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C152 | CAPACITOR, fixed: paper; .05 mfd, +40, -20%, plastic tubular case, 400 wvdc. | B+ Filter | CN-100-3 |
| C153 A,B | CAPACITOR, fixed: ceramic; dual unit, .01 mfd, ea. sect., 500 wvdc, disc type. | Filament Bypass | CC-100-23 |
| C154 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | RF Bypass | CC-100-16 |
| C155 | CAPACITOR, fixed: mica; 470 mmfd, ±10%, char. A, 500 wvdc. | RF Line Bypass | CM20A471K |
| C156 | CAPACITOR, fixed: mica; 470 mmfd, ±10%, char. A, 500 wvdc. | RF Line Bypass | CM20A471K |
| C157 A,B | CAPACITOR, fixed: ceramic; dual unit, .01 mfd, each sect, 500 wvdc, disc type. | Filament Bypass | CC-100-23 |
| C158 A,B | CAPACITOR, fixed: ceramic; dual unit, .01 mfd, each sect, 500 wvdc, disc type. | RF Bypass | CC-100-23 |
| E100 | BOARD, terminal: general purpose barrier type; three 6-32 binding head machine screws. | Antenna Input | TM-100-3 |
| E101 | BOARD, terminal: general purpose barrier type; eight 6-32 binding head machine screws. | Diversity & Audio Terminals | TM-100-8 |
| E102 | BOARD, terminal: general purpose barrier type ; eight 6-32 binding head machine screws. | Remote control Terminals | TM-100-8 |
| F100 | FUSE, cartridge: 2 amp. | Line Fuse | FU-100-2 |
| I100 | LAMP, incandescent: 6-8 volts, .250 amp. T-3-1/4 clear bulb. | Pilot Light | BI-101-44 |
| J100 | CONNECTOR, coaxial: female contact BNC type receptacle; 52 ohms impedance, single hole mounted. | IF Output | UG-625/U |
| J101 | CONNECTOR, coaxial: female contact BNC type receptacle; 52 ohms impedance, single hole mounted. | HFO Input | UG-625/U |
| J102 | CONNECTOR, coaxial: female contact BNC type receptacle; 52 ohms impedance, single hole mounted. | HFO Output | UG-625/U |
| J103 | CONNECTOR, coaxial: female contact BNC type receptacle, 52 ohms impedance, single hole mounted. | BFO Input | UG-625/U |
| J104 | CONNECTOR, coaxial: female contact BNC type receptacle; 52 ohms impedance, single hole mounted. | BFO Output | UG-625/U |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| J105 | CONNECTOR, female contact: polarized; four contact bracket type. | Power Supply Jack | JJ-120-2 |
| J106 | JACK, open circuit: insulated. | Phone Jack | JJ034 |
| J107 | CONNECTOR, multiple contact: 4 coaxial female contacts; 8 non-coaxial male contacts. | RF Connector | JJ-104 |
| J108 | CONNECTOR, male contact: polarized; twist lock. | AC Input | JJ-115 |
| J109 | JACK, connector: 75 ohm, coaxial female receptacle, mica filled bakelite dielectric. | ANT. Input | SO-239 |
| L100 | INDUCTOR, 15 henries: 85 ma DC; 270 ohms DC res, 2,500 volts, RMS Test. | Power Supply Filter | TF5000 |
| L101 | INDUCTOR, 15 henries: 85 ma DC; 270 ohms DC res, 2,500 volts RMS Test. | Power Supply Filter | TF5000 |
| L102 | CHOKE, RF: 2.5 mh; 50 ma with axial leads. | BFO Filter | CL-101-3 |
| L103 | INDUCTOR, fixed: BFO coil. | Part of Oscillator tank | A-164 |
| L104 | CHOKE, RF: 2.5 mh, 50 ma, with axial leads. | BFO plate load | CL-101-3 |
| R100 | RESISTOR, fixed: composition; 270,000 ohms, ±10%, 1/2 watt. | IF Grid resistor | RC20GF274K |
| R101 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode bias | RC20GF221K |
| R102 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen voltage divider | RC20GF104K |
| R103 | RESISTOR, fixed: composition; 68,000 ohms, ±10%, 1/2 watt. | Part of Screen voltage divider | RC20GF683K |
| R104 | RESISTOR, fixed: composition; 2200 ohms, ±10%, 1/2 watt. | Plate decoupling | RC20GF222K |
| R105 | RESISTOR, fixed: composition; 33,000 ohms, ±5%, 1/2 watt. | AVC Decoupling | RC20GF333J |
| R106 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode bias | RC20GF221K |
| R107 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen voltage divider | RC20GF104K |
| R108 | RESISTOR, fixed: composition; 68,000 ohms, ±10%, 1/2 watt. | Part of Screen voltage divider | RC20GF683K |
| R109 | RESISTOR, fixed: composition; 2200 ohms, ±10%, 1/2 watt. | Plate Decoupling | RC20GF222K |
| R110 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R111 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen voltage divider | RC20GF104K |
| R112 | RESISTOR, fixed: composition; 68,000 ohms, ±10%, 1/2 watt. | Part of Screen voltage divider | RC20GF683K |
| R113 | RESISTOR, fixed: composition; 2,200 ohms, ±10%, 1/2 watt. | Plate decoupling | RC20GF222K |
| R114 | RESISTOR, fixed: composition; 6,800 ohms, ±5%, 1/2 watt. | Part of AVC Delay | RC20GF682J |
| R115 | RESISTOR, fixed: composition; 270,000 ohms, ±5%, 1/2 watt. | Part of AVC Delay | RC20GF274J |
| R116 | RESISTOR, fixed: composition, 1.2 megohm, ±10%, 1/2 watt. | AVC Load | RC20GF125K |
| R117 | RESISTOR, fixed: composition; 1.2 megohm, ±10%, 1/2 watt. | Part of AVC Time Constant | RC20GF125K |
| R118 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | 2nd Detector Load | RC20GF474K |
| R119 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1/2 watt. | Part of I.F. Filter | RC20GF473K |
| R120 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Noise Limiter | RC20GF474K |
| R121 | RESISTOR, variable: composition; 1 megohm, ±20%, audio taper, 3/8-32 x 3/8 bushing, 1/4 in. diameter shaft 7/8 in. from mounting surface. | Audio Gain Control | RV4ATRD105D |
| R122 | RESISTOR, fixed: composition; 2200 ohms, ±10%, 1/2 watt. | Cathode bias | RC20GF222K |
| R123 | RESISTOR, fixed: composition; 120,000 ohms, ±10%, 1/2 watt. | Plate Filter | RC20GF124K |
| R124 | RESISTOR, fixed: composition; 120,000 ohms, ±10%, 1/2 watt. | Plate Load | RC20GF124K |
| R125 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Grid Leak | RC20GF474K |
| R126 | RESISTOR, fixed: composition; 510 ohms, ±5%, 1 watt. | Cathode bias | RC30GF511J |
| R127 | RESISTOR, fixed: compsoition; 1500 ohms, ±10%, 2 watts. | Filter | RC42GF152K |
| R128 | RESISTOR, fixed: 3900 ohms, ±5%, 1/2 watt. | Audio Level | RC20GF392J |
| R129 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Reactance Tube Grid Filter | RC20GF474K |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R130 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Reactance Tube Grid Filter | RC20GF474K |
| R131 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Reactance Tube Grid Filter | RC20GF474K |
| R132 | RESISTOR, fixed: composition; 120,000 ohms, ±10%, 1/2 watt. | Grid Leak | RC20GF124K |
| R133 | RESISTOR, fixed: composition; 82000 ohms, ±5%, 1/2 watt. | Part of Reactance Tube Phase Circuit | RC20GF823J |
| R134 | RESISTOR, fixed: composition; 180 ohms, ±10%, 1/2 watt. | Cathode Degeneration | RC20GF181K |
| R135 | RESISTOR, fixed: composition; 1000 ohms, ±5%, 1/2 watt. | Cathode bias | RC20GF102J |
| R136 | RESISTOR, variable: composition; 2500 ohms, ±10%, 2 watts, 1/4 in. lg. x 1/4 in. diam, slotted shaft. | Reactance Tube Balance | RV4ATSA252A |
| R137 | RESISTOR, fixed: composition; 33,000 ohms, ±5%, 1/2 watt. | Reactance Tube Grid Resistor | RC20GF333J |
| R138 | RESISTOR, fixed: composition; 56,000 ohms, ±10%, 1/2 watt. | Reactance Tube Plate Resistor | RC20GF563K |
| R139 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1/2 watt. | Oscillator Grid Resistor | RC20GF473K |
| R140 | RESISTOR, fixed: composition; 120 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF121K |
| R141 | RESISTOR, fixed: composition; 120,000 ohms, ±10%, 1/2 watt. | Oscillator Screen Resistor | RC20GF124K |
| R142 | RESISTOR, fixed: composition; 3.3 megohms, ±10%, 1/2 watt. | AVC Decoupling | RC20GF335K |
| R143 | RESISTOR, variable: composition; 50,000 ohms, ±10%, reverse log taper with SPST switch, 3/8-32 x 3/8 bushing 1/4 diam. shaft 7/8 in. from mounting surface. | RF Gain Control | RV4BTRD503E |
| R144 | RESISTOR, fixed: composition; 6800 ohms, ±5%, 1/2 watt. | Voltage Divider | RC20GF682J |
| R145 | RESISTOR, fixed: composition; 150,000 ohms, ±5%, 1/2 watt. | Voltage Divider | RC20GF154J |
| R146 | RESISTOR, fixed: composition; 6800 ohms, ±5%, 1/2 watt. | Voltage Divider | RC20GF682J |
| R147 | RESISTOR, fixed: composition; 150,000 ohms, ±5%, 1/2 watt. | Voltage Divider | RC20GF154J |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R148 | RESISTOR, fixed: wire wound; 5000 ohms, ±10%, 20 watts. | Current Limiting | RW-110-30 |
| R149 | RESISTOR, fixed: wire wound; 600 ohms, ±10%, 25 watts. | Negative Bias | RW-102 |
| R150 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor | RC20GF220K |
| S100 | SWITCH, toggle: SPST; 3 amp, 250 V. | Noise Limiter On-Off | ST12A |
| S101 | SWITCH, toggle: DPDT; 3 amp, 250 V. (one pole unused). | AVC - Manual | ST22N |
| S102 | SWITCH, rotary: SPST; 3 amp, 250 V. (part of R143). | On - Off Power | |
| S103 | SWITCH, rotary: single section; mycalex insulation. | Slave, Master Xtal Operational | SW-100 |
| S104 | SWITCH, toggle: SPST; 3 amp, 250 V. | BFO On - Off Switch | ST12A |
| T100 | TRANSFORMER, RF: 300 ohms balanced to 75 ohms unbalanced, open construction, plastic molded case. | Antenna Matching Transformer | TR-021 |
| T101 | TRANSFORMER, IF: 455 Kcs. | IF Transformer | A-157 |
| T102 | TRANSFORMER, IF: 455 Kcs. | IF Transformer | A-157 |
| T103 | TRANSFORMER, IF: 455 kcs. | IF Transformer | A-157 |
| T104 | TRANSFORMER, audio: 5000 ohms primary, 600 ohms, 8 ohms secdy. | Output Transformer | TF-100 |
| T105 | TRANSFORMER, filament and power: input 110/220 volts, 50/60 cycle, single phase, four output windings. | Power Transformer | TF-101 |
| V100 | TUBE, electron: 6BA6, miniature 7 pin pentode. | 1st IF | 6BA6 |
| V101 | TUBE, electron: 6BA6, miniature 7 pin pentode. | 2nd IF | 6BA6 |
| V102 | TUBE, electron: 6BA6, miniature 7 pin pentode. | 3rd IF | 6BA6 |
| V103 | TUBE, electron: 6AL5, miniature 7 pin twin diode. | 2nd det. & AVC | 6AL5 |
| V104 | TUBE, electron: 6T8, miniature 9 pin triple diode. | Noise Limiter & 1st Audio | 6T8 |
| V105 | TUBE, electron: 6AQ5, miniature 7 pin beam power amplifier. | Audio Output | 6AQ5 |
| V106 | TUBE, electron: 6J6, miniature 7 pin UHF twin triode. | Balance Reactance Modulator | 6J6 |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| V107 | TUBE, electron: 6AG5, miniature 7 pin pentode. | BFO Oscillator | 6AG5 |
| V108 | TUBE, electron: 5Y3GT, duo-diode rectifier, octal. | Rectifier | 5Y3GT |
| V109 | TUBE, electron: OA2, miniature 7 pin voltage regulator. | Voltage Regulator | OA2 |
| W100 | CABLE ASSEMBLY, power: female twist-lock type plug one end, non-polarized male plug opposite end. | AC Line Cord | CA-103 |
| Y100 | CRYSTAL UNIT, quartz: 455 Kcs, .01%, hermetically sealed can. (supplied only on customer request). | Freq. Determining Element. | CR-46/U |
| XF100 | HOLDER, fuse: extractor post type; for single AGC fuse. | | FH-100-2 |
| XI100 | LIGHT, indicator: with red frosted lens, for miniature bay base lamp. | Pilot Light | TS-106-1 |
| XV100 101, 102, 103, 105, 106, 107, 109 | SOCKET, tube: 7 pin miniature | Tube Sockets | TS102P01 |
| XV104 | SOCKET, tube: 9 pin miniature. | V104 Socket | TS103P01 |
| XV108 | SOCKET, tube: octal. | V106 Socket | TS101P01 |
| XY100 | SOCKET, crystal: ceramic, .487 in, spacing, for .050 in. pins. | Crystal holder | TS-104-1 |

TN-274/FRR-502
TUNING DRAWER, MODEL FFRD-1 (50-100 Kcs.)

SYMBOLIZED WITH SERIES 100 THROUGH 199 NUMBERS

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C101 | CAPACITOR, variable: air dielectric; four sections, 0-455 mmfd. each section. | Frequency Tuning Capacitor | CB-129 |
| C102 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | High Freq. Band Adj. Trimmer V100 | CV11C450 |
| C103 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O R.F. Tank, V100 | CC35CH680J |
| C104 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Coupling Cap., V100 | CC-100-16 |
| C105 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | AVC Decoupling Cap., V100 | CC-100-16 |
| C106 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Screen Bypass Cap., V100 | CC-100-16 |
| C107 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V101 | CC-100-16 |
| C108 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%; 500 wvdc; disc type. | AVC Decoupling Cap., V101 | CC-100-16 |
| C109 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | High Freq. Band Adj. Trimmer V101 | CV11C450 |
| C110 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O RF Tank, V101 | CC35CH680J |
| C111 | CAPACITOR, fixed: ceramic; 82 mmfd., ±5%; 500 wvdc. | P/O RF Tank, V101 | CC21SL820J |
| C112 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V101 | CC-100-16 |
| C113 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Screen Bypass Cap., V101 | CC-100-16 |
| C114 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V101 | CC-100-16 |
| C115 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V102 | CC-100-16 |
| C116 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | High Freq. Band Adj. Trimmer V102 | CV11C450 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C117 | CAPACITOR, fixed: ceramic; 68 mmfd, ±5%; 500 wvdc. | P/O RF Tank, V102 | CC35CH680J |
| C118 | CAPACITOR, fixed: ceramic; 82 mmfd, ±5%; 500 wvdc. | P/O RF Tank, V102 | CC21SL820J |
| C119 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Cathode Bypass Cap., V102 | CC-100-16 |
| C120 | CAPACITOR, fixed: mica; 160 mmfd; ±5%; char. D; 500 wvdc. | Part of IF Tank, V102 | CM20D161J |
| C121 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Plate Decoupling Cap., V102 | CC-100-16 |
| C122 | CAPACITOR, fixed: mica; 620 mmfd., ±5%; char. D; 500 wvdc. | Part of IF Tank, V102 | CM20D621J |
| C123 | CAPACITOR, variable: ceramic; 3-12 mmfd., 500 wvdc. | Phasing Cap., V102 | CV11A120 |
| C124 | CAPACITOR, fixed: mica; 680 mmfd; ±5%; char. D; 500 wvdc. | P/O Output Tank V102 | CM20D681J |
| C125 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Grid Filter Cap., V103 | CC-100-16 |
| C126 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Grid Filter Cap., V103 | CC-100-16 |
| C127 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Grid Filter Cap., V103 | CC-100-16 |
| C128 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | Balance Control Trimmer, V103 | CV11C450 |
| C129 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%; 500 wvdc. | Screen Bypass Cap., V103 | CC21SL470K |
| C130 | CAPACITOR, fixed: ceramic; 10 mmfd., ±.5 mmfd., 500 wvdc. | Coupling Cap., V103 | CC21SL100D |
| C131 | CAPACITOR, fixed: ceramic; 100 mmfd, ±5%; 500 wvdc. | Osc. Padder Cap., V104 | CC32CH101J |
| C132 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | Osc. Trimmer Cap., V104 | CV11C450 |
| C133 | CAPACITOR, fixed: ceramic; 150 mmfd., ±5%; 500 wvdc. | P/O Osc. Tank V104 | CC45CH151J |
| C134 | CAPACITOR, fixed: ceramic; 47 mmfd., ±10%, 500 wvdc. | Osc. Grid Coupling Cap., V104 | CC21SL470K |
| C135 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Cathode Bypass Cap., V104 | CC-100-16 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C136 | CAPACITOR, fixed: ceramic; 120 mmfd., ±10%, 500 wvdc. | Screen Bypass Cap., V104 | CC-101-4 |
| C137 | CAPACITOR, fixed: ceramic; .01 mfd, +80%-20%, 500 wvdc; disc type. | Screen Coupling Cap., V104 | CC-100-16 |
| C138 | CAPACITOR, variable: air dielectric; 3.2-50 mmfd. | Crystal Tuning Cap., V104 | CT-104-1 |
| C139 | CAPACITOR, fixed: ceramic; .01 mfd, +80%-20%, 500 wvdc; disc type. | Plate Bypass Cap., V104 | CC-100-16 |
| C140 | CAPACITOR, fixed: ceramic; 10 mmfd, ±.5 mmfd; 500 wvdc. | Osc. Injection Cap., V104 | CC21SL100D |
| C141 | CAPACITOR, fixed: ceramic; 10 mmfd, ±.5 mmfd., 500 wvdc. | HFO Output Cap., V104 | CC21SL100D |
| C142 | CAPACITOR, fixed: moulded plastic; .1 mfd., +40%-10%, 400 wvdc. | Plate Decoupling Cap., V100 | CN-100-4 |
| C143 | CAPACITOR, fixed: moulded plastic; .1 mfd., +40%-10%, 400 wvdc. | Plate Decoupling Cap., V100 | CN-100-4 |
| C144 | CAPACITOR, fixed: ceramic; .01 mfd, +80%-20%, 500 wvdc; disc type. | RF Bypass Cap., V100 | CC-100-16 |
| C145 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Filament Bypass Cap., V102 | CC-100-16 |
| C146 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Filament Bypass Cap., V102 | CC-100-16 |
| C147 | CAPACITOR, fixed: ceramic; 30 mmfd., ±5%, 500 wvdc. | Grid Coupling Capacitor | CC21SL300J |
| C148 | CAPACITOR, fixed: ceramic; 30 mmfd., ±5%, 500 wvdc. | Grid Coupling Capacitor | CC21SL300J |
| I101 | LAMP, incandescent: 6-8 volts; 250 ma DC; bayonet base. | Pilot Light | BI-101-44 |
| L200 | TRANSFORMER, RF: tune: 770 microhenries, ±40 microhenries, Q=25; tapped at 420 microhenries, ±42 microhenries, Q=20; and 285 microhenries, ±30 microhenries, Q=15. | Osc. Tank | A-1263 |
| L101 | COIL, RF: tuned: 105 microhenries, ±6 microhenries; Q=80. | Xtal Filter Output Tank | A-1252 |
| P101 | CONNECTOR, multiple contact: 4 coaxial contacts and 8 non-coaxial contacts. | RF Head Connector | PL-109 |
| R101 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor V100 | RC20GF220K |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R102 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | Grid Bias Res., V100 | RC20GF474K |
| R103 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | AVC Filter Res., V100 | RC20GF104K |
| R104 | RESISTOR, fixed: composition; 220 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V100 | RC20GF221K |
| R105 | RESISTOR, fixed: composition; 10 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V100 | RC20GF100K |
| R106 | RESISTOR, fixed: composition; 220,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V100 | RC20GF224K |
| R107 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V100 | RC20GF104K |
| R108 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 2 watts. | Plate Decoupling Res., V100 | RC42GF473K |
| R109 | RESISTOR, fixed: composition; 270,000 ohms, ±10%; 1/2 watt. | Grid Res., V101 | RC20GF274K |
| R110 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V101 | RC20GF220K |
| R111 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | Grid Bias Res., V101 | RC20GF104K |
| R112 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | AVC Filter Res., V101 | RC20GF104K |
| R113 | RESISTOR, fixed: composition; 220 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V101 | RC20GF221K |
| R114 | RESISTOR, fixed: composition; 10 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V101 | RC20GF100K |
| R115 | RESISTOR, fixed: composition; 220,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V101 | RC20GF224K |
| R116 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V101 | RC20GF104K |
| R117 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 2 watts. | Plate Decoupling Res., V101 | RC42GF473K |
| R118 | RESISTOR, fixed: composition; 270,000 ohms, ±10%; 1/2 watt. | Grid Res., V102 | RC20GF274K |
| R119 | Not Used. | | |
| R120 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | Grid Bias Res., V102 | RC20GF104K |
| R121 | RESISTOR, fixed: composition; 2200 ohms, ±10%; 1/2 watt. | Cathode Res., V102 | RC20GF222K |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R122 | RESISTOR, fixed: composition; 22,000 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V102 | RC20GF223K |
| R123 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 1 watt. | Plate Decoupling Res., V102 | RC30GF473K |
| R124 | RESISTOR, fixed: composition; 10 ohms, ±5%; 1/2 watt. | P/O Output Tank, S102 | RC20GF100J |
| R125 | RESISTOR, fixed: composition; 22 ohms, ±5%; 1/2 watt. | P/O Output Tank, S102 | RC20GF220J |
| R126 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | Grid Res., V103 | RC20GF474K |
| R127 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | P/O Grid Filter, V103 | RC20GF474K |
| R128 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | P/O Grid Filter, V103 | RC20GF474K |
| R129 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 1/2 watt. | Plate Load Res., V103 | RC20GF473K |
| R130 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 1/2 watt. | Screen Res., V103 | RC20GF473K |
| R131 | RESISTOR, fixed: composition; 2700 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V103 | RC20GF272K |
| R132 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V104 | RC20GF220K |
| R133 | RESISTOR, fixed: composition; 22,000 ohms, ±10%; 1/2 watt. | Grid Res., V104 | RC20GF223K |
| R134 | RESISTOR, fixed: composition; 39,000 ohms, ±10%; 1/2 watt. | Plate Res., V104 | RC20GF393K |
| R135 | RESISTOR, fixed: composition; 120 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V104 | RC20GF121K |
| R136 | RESISTOR, fixed: composition; 39,000 ohms, ±10%; 1/2 watt. | Screen Res., V104 | RC20GF393K |
| S101 | SWITCH, rotary: non-shorting: 1 section, 3 positions; Mycalex insulation; contacts and wipers silver plated; 1/4'' drive shaft, 7/8'' lg. | Slave, Master Xtal Operational Switch | SW-100 |
| S102 | SWITCH, rotary: shorting: 1 section, 4 positions, double pole; glass melamine insulation; contacts and wipers silver alloy; 1/4'' drive shaft; 11/32'' lg,, 1/4'' flatted two sides. | Bandwidth Switch | SW-181 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| T100 | TRANSFORMER, RF: tuned; 11 millihenries, ±.6 millihenries, Q=40; tapped at 10.7 millihenries, ±.7 millihenries, Q=50. | Antenna Transformer | A-1262 |
| T101 | TRANSFORMER, RF: tuned; 11 millihenries, ±.6 millihenries, Q=40; tapped at 9.2 millihenries, ±.9 millihenries, Q=40. | RF Transformer | A-1264 |
| T102 | TRANSFORMER, RF: tuned: 11 millihenries, ±.6 millihenries, Q=40; tapped at 9.2 millihenries, ±.9 millihenries, Q=40. | Mixer Trans. | A-1264 |
| T103 | TRANSFORMER, RF: tuned; two windings; pri., 520 microhenries, ±27 microhenries, Q=60; sec., 152 microhenries, ±8 microhenries, Q=80; tapped at 50 microhenries, ±5 microhenries, Q=20. | First IF Transformer | A-1249 |
| V100 | TUBE, electron: 6AG5; miniature 7 pin. | First RF | 6AG5 |
| V101 | TUBE, electron: 6AG5; miniature 7 pin. | Second RF | 6AG5 |
| V102 | TUBE, electron: 6AU6; miniature 7 pin. | Mixer | 6AU6 |
| V103 | TUBE, electron: 6AG5; miniature 7 pin. | Reactance Tube | 6AG5 |
| V104 | TUBE, electron: 6AG5; miniature 7 pin. | HF Oscillator | 6AG5 |
| XI101 | SOCKET, lens: min. bayonet base, T-3-1/4 bulb; right angle, down turned; 5/32'' mtg. hole. | Socket for I201 | TS-107-2 |
| XV100 | SOCKET, tube: 7 pin miniature. | Socket, V100 | TS102P01 |
| XV101 | SOCKET, tube: 7 pin miniature. | Socket, V101 | TS102P01 |
| XV102 | SOCKET, tube: 7 pin miniature. | Socket, V102 | TS102P01 |
| XV103 | SOCKET, tube: 7 pin miniature. | Socket, V103 | TS102P01 |
| XV104 | SOCKET, tube: 7 pin miniature. | Socket, V104 | TS102P01 |
| XY101 | SOCKET, CRYSTAL: ceramic; .487'' spacing for .050'' pins. | Socket, Y102 | TS-104-1 |
| Y101 | CRYSTAL, UNIT, quartz: 455 Kc. | L.F. Xtal | CR-102 |
| Y102 | CRYSTAL UNIT, quartz: 500-1200 Kc (supplied at customer's request.) | | CR-104 |

TN-275/FRR-502
TUNING DRAWER, MODEL FFRD-2 (100-200 Kcs.)

SYMBOLIZED WITH SERIES 200 THROUGH 299 NUMBERS

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C201 | CAPACITOR, variable: air dielectric; four sections, 0-455 mmfd. each section. | Freq. Tuning Cap. | CB-129 |
| C202 | CAPACITOR, variable: ceramic; 7-45 mmfd, 500 wvdc. | High Freq. Band Adj. Trimmer V200 | CV11C450 |
| C203 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O R.F. Tank | CC35CH680J |
| C204 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Coupling Cap., V200 | CC-100-16 |
| C205 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | AVC Decoupling Cap., V200 | CC-100-16 |
| C206 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Screen Bypass Cap., V200 | CC-100-16 |
| C207 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V201 | CC-100-16 |
| C208 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | AVC Decoupling Cap., V201 | CC-100-16 |
| C209 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | High Freq. Band Adj. Trimmer, V201 | CV11C450 |
| C210 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O R.F. Tank, V201 | CC35CH680J |
| C211 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O R.F. Tank, V201 | CC26SL680J |
| C212 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V201 | CC-100-16 |
| C213 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Screen Bypass Cap., V201 | CC-100-16 |
| C214 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V201 | CC-100-16 |
| C215 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V202 | CC-100-16 |
| C216 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | High Freq. Band Adj. Trimmer, V202 | CV11C450 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C217 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O R.F. Tank, V202 | CC35CH680J |
| C218 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O R. F. Tank, V202 | CC26CH680J |
| C219 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Cathode Bypass Cap., V202 | CC-100-16 |
| C220 | CAPACITOR, fixed: mica; 160 mmfd.; ±5%; char. D; 500 wvdc. | Part of IF Tank, V202 | CM20D161J |
| C221 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Plate Decoupling Cap., V202 | CC-100-16 |
| C222 | CAPACITOR, fixed: mica; 620 mmfd., ±5%; char. D; 500 wvdc. | Part of IF Tank, V202 | CM20D621J |
| C223 | CAPACITOR, variable: ceramic; 3-12 mmfd., 500 wvdc. | Phasing Cap., V202 | CV11A120 |
| C224 | CAPACITOR, fixed: mica; 680 mmfd; ±5%; char. D; 500 wvdc. | P/O Output Tank, V202 | CM20D681J |
| C225 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Grid Filter Cap., V203 | CC-100-16 |
| C226 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Grid Filter Cap., V203 | CC-100-16 |
| C227 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Grid Filter Cap., V203 | CC-100-16 |
| C228 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | Balance Control Trimmer, V203 | CV11C450 |
| C229 | CAPACITOR, fixed: ceramic; 47 mmfd., ±10%; 500 wvdc. | Screen Bypass Cap., V203 | CC21SL470K |
| C230 | CAPACITOR, fixed: ceramic; 10 mmfd., ±.5 mmfd., 500 wvdc. | Coupling Cap., V203 | CC21SL100D |
| C231 | CAPACITOR, fixed: ceramic; 150 mmfd, ±5%; 500 wvdc. | Osc. Padder Cap., V204 | CC45CH151J |
| C232 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | Osc. Trimmer Cap., V204 | CV11C450 |
| C233 | CAPACITOR, fixed: ceramic; 120 mmfd., ±5%; 500 wvdc. | P/O Osc. Tank, V204 | CC35CH121J |
| C234 | CAPACITOR, fixed: ceramic; 47 mmfd., ±10%, 500 wvdc. | Osc. Grid Coupling Cap., V204 | CC21SL470K |
| C235 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Cathode Bypass Cap., V204 | CC-100-16 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C236 | CAPACITOR, fixed: ceramic; 120 mmfd., ±10%, 500 wvdc. | Screen Bypass Cap., V204 | CC-101-4 |
| C237 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Screen Coupling Cap., V204 | CC-100-16 |
| C238 | CAPACITOR, variable: air dielectric; 3.2-50 mmfd. | Crystal Tuning Cap., V204 | CT-104-1 |
| C239 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Plate Bypass Cap., V204 | CC-100-16 |
| C240 | CAPACITOR, fixed: ceramic; 10 mmfd; ±.5 mmfd; 500 wvdc. | Osc. Injection Cap., V204 | CC21SL100D |
| C241 | CAPACITOR, fixed: ceramic; 10 mmfd, ±.5 mmfd., 500 wvdc. | HFO Output Cap., V204 | CC21SL100D |
| C242 | CAPACITOR, fixed: moulded plastic; .1 mfd., +40%-10%, 400 wvdc. | Plate Decoupling Cap., V200 | CN-100-4 |
| C243 | CAPACITOR, fixed: moulded plastic; .1 mfd., +40%-10%, 400 wvdc. | Plate Decoupling Cap., V200 | CN-100-4 |
| C244 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | RF Bypass Cap., V200 | CC-100-16 |
| C245 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Filament Bypass Cap., V202 | CC-100-16 |
| C246 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Filament Bypass Cap., V202 | CC-100-16 |
| C247 | CAPACITOR, fixed: ceramic; 30 mmfd., ±5%, 500 wvdc. | Grid Coupling Capacitor | CC21SL300J |
| C248 | CAPACITOR, fixed: ceramic; 30 mmfd., ±5%, 500 wvdc. | Grid Coupling Capacitor | CC21SL300J |
| I201 | LAMP, incandescent: 6-8 volts; 250 ma DC; bayonet base. | Pilot Light | BI-101-44 |
| L200 | TRANSFORMER, RF: tune; 360 microhenries, ±35 microhenries, Q=100; tapped at 194 microhenries, ±19 microhenries, Q=65; and 162 microhenries, 16 microhenries, Q=75. | Osc. Tank | A-703 |
| L201 | COIL, RF: tuned; 105 microhenries, ±6 microhenries; Q=80. | Xtal Filter Output Tank | A-1252 |
| P201 | CONNECTOR, multiple contact; 4 coaxial contacts and 8 non-coaxial contacts. | RF Head Connector | PL-109 |
| R201 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V200 | RC20GF220K |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R202 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | Grid Bias Res., V200 | RC20GF474K |
| R203 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | AVC Filter Res., V200 | RC20GF104K |
| R204 | RESISTOR, fixed: composition; 220 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V200 | RC20GF221K |
| R205 | RESISTOR, fixed: composition; 10 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V200 | RC20GF100K |
| R206 | RESISTOR, fixed: composition; 220,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V200 | RC20GF224K |
| R207 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V200 | RC20GF104K |
| R208 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 2 watts. | Plate Decoupling Res., V200 | RC42GF473K |
| R209 | RESISTOR, fixed: composition; 220,000 ohms, ±10%; 1/2 watt. | Grid Res., V201 | RC20GF224K |
| R210 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V201 | RC20GF220K |
| R211 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | Grid Bias Res., V201 | RC20GF104K |
| R212 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | AVC Filter Res., V201 | RC20GF104K |
| R213 | RESISTOR, fixed: composition; 220 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V201 | RC20GF221K |
| R214 | RESISTOR, fixed: composition; 10 ohms, ±10%; 1/2 watt. | Parasitic Suppressor V201 | RC20GF100K |
| R215 | RESISTOR, fixed: composition; 220,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V201 | RC20GF224K |
| R216 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V201 | RC20GF104K |
| R217 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 2 watts. | Plate Decoupling Res., V201 | RC42GF473K |
| R218 | RESISTOR, fixed: composition; 220,000 ohms, ±10%; 1/2 watt. | Grid Res., V202 | RC20GF224K |
| R219 | Not Used. | | |
| R220 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | Grid Bias Res., V202 | RC20GF104K |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R221 | RESISTOR, fixed: composition; 2200 ohms, ±10%; 1/2 watt. | Cathode Res., V202 | RC20GF222K |
| R222 | RESISTOR, fixed: composition; 22,000 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V202 | RC20GF223K |
| R223 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 1 watt. | Plate Decoupling Res., V202 | RC30GF473K |
| R224 | RESISTOR, fixed: composition; 10 ohms, ±5%; 1/2 watt. | P/O Output Tank, S202 | RC20GF100J |
| R225 | RESISTOR, fixed: composition; 22 ohms, ±5%; 1/2 watt. | P/O Output Tank, S202 | RC20GF220J |
| R226 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | Grid Res., V203 | RC20GF474K |
| R227 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | P/O Grid Filter, V203 | RC20GF474K |
| R228 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | P/O Grid Filter, V203 | RC20GF474K |
| R229 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 1/2 watt. | Plate Load Res., V203 | RC20GF473K |
| R230 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 1/2 watt. | Screen Res., V203 | RC20GF473K |
| R231 | RESISTOR, fixed: composition; 2700 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V203 | RC20GF272K |
| R232 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V204 | RC20GF220K |
| R233 | RESISTOR, fixed: composition; 22,000 ohms, ±10%; 1/2 watt. | Grid Res., V204 | RC20GF223K |
| R234 | RESISTOR, fixed: composition; 39,000 ohms, ±10%; 1/2 watt. | Plate Res., V204 | RC20GF393K |
| R235 | RESISTOR, fixed: composition; 120 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V204 | RC20GF121K |
| R236 | RESISTOR, fixed: composition; 39,000 ohms, ±10%; 1/2 watt. | Screen Res., V204 | RC20GF393K |
| S201 | SWITCH, rotary: non-shorting; 1 section, 3 positions; Mycalex insulation; contacts and wipers silver plated; 1/4'' drive shaft, 7/8'' lg. | Slave, Master Xtal Operational Switch | SW-100 |
| S202 | SWITCH, rotary: shorting: 1 section, 4 positions, double pole, glass melamine insulation; contacts and wipers silver alloy; 1/4'' shaft, 11/32'' lg., 1/4'' flatted two sides. | Bandwidth Switch | SW-181 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| T200 | TRANSFORMER, RF: tuned; 2.85 millihenries, ±.15 millihenries, Q=50; tapped at 2.76 millihenries, ±.26 millihenries, Q=50. | Antenna Transformer | A-705 |
| T201 | TRANSFORMER, RF: tuned; 2.85 millihenries, ±.15 millihenries, Q=50; tapped at 1.8 millihenries, ±.18 millihenries, Q=45. | Interstage Trans. | A-707 |
| T202 | TRANSFORMER, RF: tuned; 2.85 millihenries, Q=50; tapped at 1.8 millihenries, ±.18 millihenries, Q=45 | Mixer Trans. | A-707 |
| T203 | TRANSFORMER, RF: tuned; two windings; pri., 520 microhenries, ±27 microhenries, Q=60; sec., 152 microhenries, ±8 microhenries, Q=80; tapped at 50 microhenries, ±5 microhenries, Q=20. | First IF Transformer | A-1249 |
| V200 | TUBE, electron: 6AG5; miniature 7 pin. | First RF | 6AG5 |
| V201 | TUBE, electron: 6AG5; miniature 7 pin. | Second RF | 6AG5 |
| V202 | TUBE, electron: 6AU6; miniature 7 pin. | Mixer | 6AU6 |
| V203 | TUBE, electron: 6AG5; miniature 7 pin. | Reactance Tube | 6AG5 |
| V204 | TUBE, electron: 6AG5; miniature 7 pin. | HF Osc. | 6AG5 |
| XI201 | SOCKET, lens: min. bayonet base, T-3-1/4 bulb; right angle, down turned; 5/32'' mtg. hole. | Socket for I201 | TS-107-2 |
| XV200 | SOCKET, tube: 7 pin miniature. | Socket, V200 | TS102P01 |
| XV201 | SOCKET, tube: 7 pin miniature. | Socket, V201 | TS102P01 |
| XV202 | SOCKET, tube: 7 pin miniature. | Socket, V202 | TS102P01 |
| XV203 | SOCKET, tube: 7 pin miniature. | Socket, V203 | TS102P01 |
| XV204 | SOCKET, tube: 7 pin miniature. | Socket, V204 | TS102P01 |
| XY201 | SOCKET, CRYSTAL: ceramic; .487'' spacing for .050'' pins. | Socket, Y202 | TS-104-1 |
| Y201 | CRYSTAL UNIT, quartz: 455 Kc. | L. F. Xtal | CR-102 |
| Y202 | CRYSTAL UNIT, quartz; 500-1200 Kc (supplied at customer's request.) | | CR-104 |

TN-276/FRR-502
TUNING DRAWER, MODEL FFRD-3 (200-400 Kcs.)

SYMBOLIZED WITH SERIES 300 THROUGH 399 NUMBERS

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C301 | CAPACITOR, variable: air dielectric; four sections, 0-455 mmfd. each section. | Freq. Tuning Cap. | CB-129 |
| C302 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | High Freq. Band Adj. Trimmer V300 | CV11C450 |
| C303 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O R.F. Tank | CC35CH680J |
| C304 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc. disc type. | Coupling Cap., V300 | CC-100-16 |
| C305 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | AVC Decoupling Cap., V300 | CC-100-16 |
| C306 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Screen Bypass Cap., V300 | CC-100-16 |
| C307 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V301 | CC-100-16 |
| C308 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Plate Decoupling Cap., V301 | CC-100-16 |
| C309 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | High Freq. Band Adj. Trimmer, V301 | CV11C450 |
| C310 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O R.F. Tank, V301 | CC35CH680J |
| C311 | CAPACITOR, fixed: ceramic; 30 mmfd., ±5%; 500 wvdc. | Grid Coupling Cap., V301 | CC21SL300 J |
| C312 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | AVC Decoupling Cap., V301 | CC-100-16 |
| C313 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Screen Bypass Cap., V301 | CC-100-16 |
| C314 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | D.C. Blocking Cap., V301 | CC-100-16 |
| C315 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Plate Decoupling Cap., V302 | CC-100-16 |
| C316 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | High Freq. Band Adj. Trimmer, V302 | CV11C450 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C317 | CAPACITOR, fixed: ceramic; 68 mmfd., ±5%; 500 wvdc. | P/O R. F. Tank, V302 | CC35CH680J |
| C318 | CAPACITOR, fixed: ceramic; 30 mmfd., ±5%; 500 wvdc. | Grid Coupling Cap., V302 | CC21SL300J |
| C319 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Cathode Bypass Cap., V302 | CC-100-16 |
| C320 | CAPACITOR, fixed: mica; 160 mmfd; ±5%; char. D; 500 wvdc. | P/O I F Tank, V302 | CM20D161J |
| C321 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Plate Decoupling Cap., V302 | CC-100-16 |
| C322 | CAPACITOR, fixed: mica; 620 mmfd., ±5%; char. D; 500 wvdc. | P/O IF Tank, V302 | CM20D621J |
| C323 | CAPACITOR, variable: ceramic; 3-12 mmfd., 500 wvdc. | Phasing Cap., V302 | CV11A120 |
| C324 | CAPACITOR, fixed: mica; 680 mmfd; ±5%; char. D; 500 wvdc. | P/O Output Tank, V302 | CM20D681J |
| C325 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Grid Filter Cap., V303 | CC-100-16 |
| C326 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Grid Filter Cap., V303 | CC-100-16 |
| C327 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Grid Filter Cap., V303 | CC-100-16 |
| C328 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | Balance Control Trimmer, V303 | CV11C450 |
| C329 | CAPACITOR, fixed: ceramic; 47 mmfd., ±10%; 500 wvdc. | Screen Bypass Cap., V303 | CC21SL470K |
| C330 | CAPACITOR, fixed: ceramic; 15 mmfd., ±.5 mmfd., 500 wvdc. | Coupling Cap., V303 | CC21SL150D |
| C331 | CAPACITOR, fixed: ceramic; 300 mmfd., ±5%; 500 wvdc. | Osc. Padder Cap., V304 | CC45CH301J |
| C332 | CAPACITOR, variable: ceramic; 7-45 mmfd., 500 wvdc. | Osc. Trimmer Cap., V304 | CV11C450 |
| C333 | CAPACITOR, fixed: ceramic; 120 mmfd., ±5%; 500 wvdc. | P/O Osc. Tank, V304 | CC35CH121J |
| C334 | CAPACITOR, fixed: ceramic; 47 mmfd., ±10%; 500 wvdc. | Osc. Grid Coupling Cap., V304 | CC21SL470K |
| C335 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Cathode Bypass Cap., V304 | CC-100-16 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C336 | CAPACITOR, fixed: ceramic; 120 mmfd., +10%, 500 wvdc. | Screen Bypass Cap., V304 | CC-101-4 |
| C337 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Screen Coupling Cap., V304 | CC-100-16 |
| C338 | CAPACITOR, variable: air dielectric; 3.2-50 mmfd. | Crystal Tuning Cap., V304 | CT-104-1 |
| C339 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Plate Bypass Cap., V304 | CC-100-16 |
| C340 | CAPACITOR, fixed: ceramic; 10 mmfd., ±.5 mmfd; 500 wvdc. | Osc. Injection Cap., V304 | CC21SL100D |
| C341 | CAPACITOR, fixed: ceramic; 10 mmfd., ±.5 mmfd., 500 wvdc. | HFO Output Cap., V304 | CC21SL100D |
| C342 | CAPACITOR, fixed: moulded plastic; .1 mfd., +40%-10%, 400 wvdc. | Plate Decoupling Cap., V300 | CN-100-4 |
| C343 | CAPACITOR, fixed: moulded plastic; .1 mfd., +40%-10%, 400 wvdc. | Plate Decoupling Cap., V300 | CN-100-4 |
| C344 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | R.F. Bypass Cap., V300 | CC-100-16 |
| C345 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Filament Bypass Cap., V302 | CC-100-16 |
| C346 | CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. | Filament Bypass Cap., V302 | CC-100-16 |
| C347 | CAPACITOR, fixed: mica; 1500 mmfd., ±2%, char. C; 500 wvdc. | P/O Ant. Filter Capacitor | CM20C152G |
| C348 | CAPACITOR, fixed: mica; 560 mmfd., ±5%, char. C; 500 wvdc. | P/O Ant. Filter Capacitor | CM20C561J |
| C349 | CAPACITOR, fixed: mica; 1100 mmfd., ±5%, char. C; 500 wvdc. | P/O Ant. Filter Capacitor | CM20C112J |
| C350 | CAPACITOR, fixed: mica; 560 mmfd., ±5%, char. C; 500 wvdc. | P/O Ant. Filter Capacitor | CM20C561J |
| C351 | CAPACITOR, fixed: mica; 1500 mmfd., ±2%, char. C; 500 wvdc. | P/O Ant. Filter Capacitor | CM20C152G |
| I301 | LAMP, incandescent: 6-8 volts; 250 ma DC; bayonet base. | Pilot Light | BI-101-44 |
| L300 | TRANSFORMER, RF: tuned; 196 microhenries, ±10 microhenries, Q=30: tapped at 100 microhenries, ±10 microhenries, Q=20; and 110 microhenries, ±10 microhenries, Q=50. | Osc. Tank | A-1312 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| L301 | COIL, RF: tuned; 105 microhenries, ±6 microhenries; Q=80. | Xtal Filter Output | A-1252 |
| L302 | COIL, RF: fixed: 93 microhenries, ±1 microhenry, Q=70. | P/O Ant. Filter | A-1317 |
| L303 | COIL, RF: fixed: 93 microhenries, ±1 microhenry, Q=70. | P/O Ant. Filter | A-1317 |
| P301 | CONNECTOR, multiple contact; 4 coaxial contacts and 8 non-coaxial contacts. | RF Head Connector | PL-109 |
| R301 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V300 | RC20GF220K |
| R302 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | Grid Bias Res., V300 | RC20GF474K |
| R303 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | AVC Filter Res., V300 | RC20GF104K |
| R304 | RESISTOR, fixed: composition; 220 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V300 | RC20GF221K |
| C305 | RESISTOR, fixed: composition; 10 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V300 | RC20GF100K |
| R306 | RESISTOR, fixed: composition; 220,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V300 | RC20GF224K |
| R307 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V300 | RC20GF104K |
| R308 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 2 watts. | Plate Decoupling Res., V300 | RC42GF473K |
| R309 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | Grid Res., V301 | RC20GF104K |
| R310 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor,V301 | RC20GF220K |
| R311 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | Grid Bias Res., V301 | RC20GF474K |
| R312 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | AVC Filter Res., V301 | RC20GF104K |
| R313 | RESISTOR, fixed: composition; 220 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V301 | RC20GF221K |
| R314 | RESISTOR, fixed: composition; 10 ohms, ±10%; 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R315 | RESISTOR, fixed: composition; 220,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V301 | RC20GF224K |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R316 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | P/O Screen Voltage Divider, V301 | RC20GF104K |
| R317 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 2 watts. | Plate Decoupling Res., V301 | RC42GF473K |
| R318 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | Grid Res., V302 | RC20GF104K |
| R319 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | P/O Tank, V302 | RC20GF104K |
| R320 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | Grid Bias Res., V302 | RC20GF104K |
| R321 | RESISTOR, fixed: composition; 2200 ohms, ±10%; 1/2 watt. | Cathode Res., V302 | RC20GF222K |
| R322 | RESISTOR, fixed: composition; 22,000 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V302 | RC20GF223K |
| R323 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 1 watt. | Plate Decoupling Res., V302 | RC30GF473K |
| R324 | RESISTOR, fixed: composition; 10 ohms, ±5%; 1/2 watt. | P/O Output Tank, S302 | RC20GF100J |
| R325 | RESISTOR, fixed: composition; 22 ohms, ±5%; 1/2 watt. | P/O Output Tank, S302 | RC20GF220J |
| R326 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | Grid Res., V303 | RC20GF474K |
| R327 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | P/O Grid Filter, V303 | RC20GF474K |
| R328 | RESISTOR, fixed: composition; 470,000 ohms, ±10%; 1/2 watt. | P/O Grid Filter, V303 | RC20GF474K |
| R329 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 1/2 watt. | Plate Load Res., V303 | RC20GF473K |
| R330 | RESISTOR, fixed: composition; 47,000 ohms, ±10%; 1/2 watt. | Screen Res., V303 | RC20GF473K |
| R331 | RESISTOR, fixed: composition; 2700 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V303 | RC20GF272K |
| R332 | RESISTOR, fixed: composition; 22 ohms, ±10%; 1/2 watt. | Parasitic Suppressor, V304 | RC20GF220K |
| R333 | RESISTOR, fixed: composition; 22,000 ohms, ±10%; 1/2 watt. | Grid Res., V304 | RC20GF223K |
| R334 | RESISTOR, fixed: composition; 39,000 ohms, ±10%; 1/2 watt. | Plate Res., V304 | RC20GF393K |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R335 | RESISTOR, fixed: composition; 120 ohms, ±10%; 1/2 watt. | Cathode Bias Res., V304 | RC20GF121K |
| R336 | RESISTOR, fixed: composition; 39,000 ohms, ±10%; 1/2 watt. | Screen Res., V304 | RC20GF393K |
| R337 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | P/O Tank, V300 | RC20GF104K |
| R338 | RESISTOR, fixed: composition; 100,000 ohms, ±10%; 1/2 watt. | P/O Tank, V301 | RC20GF104K |
| S301 | SWITCH, rotary: non-shorting; 1 section, 3 positions; Mycalex insulation; contacts and wipers silver plated; 1/4'' drive shaft, 7/8'' lg. | Slave, Master Xtal Operational Switch | SW-100 |
| S302 | SWITCH, rotary: shorting: 1 section, 4 positions, double pole; glass melamine insulation; contacts and wipers silver alloy; 1/4'' drive shaft; 11/32'' lg., 1/4'' flatted two sides. | Bandwidth Switch | SW-181 |
| T300 | TRANSFORMER, RF: tuned; 650 microhenries, ±35 microhenries, Q=100; tapped at 590 microhenries, ±30 microhenries, Q=90. | Antenna Transformer | A-1313 |
| T301 | TRANSFORMER, RF: tuned; 650 microhenries, ±35 microhenries, Q=90; tapped at 400 microhenries, ±40 microhenries, Q=75. | RF Transformer | A-1314 |
| T302 | TRANSFORMER, RF: tuned; 650 microhenries, ±35 microhenries, Q=90; tapped at 400 microhenries, ±40 microhenries, Q=75. | Mixer Trans. | A-1314 |
| T303 | TRANSFORMER, RF: tuned; two windings; pri., 520 microhenries, ±27 microhenries, Q=60; sec., 152 microhenries, ±8 microhenries, Q=80; tapped at 50 microhenries, ±5 microhenries, Q=20. | First IF Transformer | A-1249 |
| V300 | TUBE, electron: 6AG5; miniature 7 pin. | First IF | 6AG5 |
| V301 | TUBE, electron: 6AG5; miniature 7 pin. | Second IF | 6AG5 |
| V302 | TUBE, electron: 6AU6; miniature 7 pin. | Mixer | 6AU6 |
| V303 | TUBE, electron: 6AG5; miniature 7 pin. | Reactance Tube | 6AG5 |
| V304 | TUBE, electron: 6AG5; miniature 7 pin. | HF Osc. | 6AG5 |
| XI301 | SOCKET, lens: min. bayonet base, T-3-1/4 bulb; right angle, down turned; 5/32'' mtg. hole. | Socket for I301 | TS-107-2 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| XV300 | SOCKET, tube: 7 pin miniature. | Socket, V300 | TS102P01 |
| XV301 | SOCKET, tube: 7 pin miniature. | Socket, V301 | TS102P01 |
| XV302 | SOCKET, tube: 7 pin miniature. | Socket, V302 | TS102P01 |
| XV303 | SOCKET, tube: 7 pin miniature. | Socket, V303 | TS102P01 |
| XV304 | SOCKET, tube: 7 pin miniature. | Socket, V304 | TS102P01 |
| XY301 | SOCKET, CRYSTAL: ceramic; .487'' spacing for .050'' pins. | Socket, Y302 | TS-104-1 |
| Y301 | CRYSTAL UNIT, quartz: 455 Kc. | L.F. Crystal | CR-102 |
| Y302 | CRYSTAL UNIT, quartz: 500-1200 Kc. (supplied at customer's request.) | | CR-104 |

TUNING DRAWER MODEL FFRD-3M (500 Kcs, ±10 Kcs,) IS SYMBOLIZED WITH SERIES 1 THROUGH 99 NUMBERS

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C1 | CAPACITOR, fixed: mica; 1,000 mmfd, ±2%, Char E, 500 wvdc. | RF Tank, T1 | CM20E102G |
| C2 | CAPACITOR, variable; ceramic; 7-45 mmfd, 500 wvdc. | HF Band Adjust | CV11C450 |
| C3 | CAPACITOR, variable: air dielectric; four sect., 10 to 135 mmfd ea sect. | Frequency Tuning | CB-101 |
| C4 | CAPACITOR, fixed: ceramic; 1,000 mmfd, 500 wvdc, disc type. | Grid Coupling | CC-100-9 |
| C5 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C6 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C7 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C8 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C9 | CAPACITOR, fixed: mica; 1,000 mmfd, ±2%, Char E, 500 wvdc. | RF Tank, T2 | CM20E102G |
| C10 | CAPACITOR, variable: ceramic; 7-45 mmfd, 500 wvdc. | HF Band Adjust | CV11C450 |
| C11 | CAPACITOR, fixed: ceramic; 1,000 mmfd, 500 wvdc, disc type. | Grid Coupling | CC-100-9 |
| C12 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C13 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C14 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C15 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C16 | CAPACITOR, fixed: mica; 1,000 mmfd, ±2%, Char E, 500 wvdc. | RF Tank, T3 | CM20E102G |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C17 | CAPACITOR, variable: ceramic; 7-45 mmfd, 500 wvdc. | HF Band Adjust | CV11C450 |
| C18 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C19 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C20 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, Char D, 500 wvdc. | Part of IF Tank | CM20D621G |
| C21 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, Char D, 500 wvdc. | Part of IF Tank | CM20D621G |
| C22 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C23 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C24 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C25 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C26 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Reactance Tube Filter | CC-100-16 |
| C27 | CAPACITOR, variable: ceramic; 7-45 mmfd, 500 wvdc. | Reactance Tube Bal Control | CV11C450 |
| C28 | CAPACITOR, fixed: ceramic; 30 mmfd, ±10%, 500 wvdc. | Reactance Bal | CC21SL300K |
| C29 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C30 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Reactance Tube Screen Bypass | CC21SL470K |
| C31 | CAPACITOR, fixed: mica; 300 mmfd, ±2%, Char E, 500 wvdc. | Reactance Coupling | CM20E301G |
| C32 | CAPACITOR, fixed: mica; 500 mmfd, ±2%, Char E, 500 wvdc. | Oscillator Tank | CM20E501G |
| C33 | CAPACITOR, fixed: mica; 300 mmfd, ±2%, Char E, 500 wvdc. | Oscillator Pad | CM20E301G |
| C34 | CAPACITOR, fixed: ceramic; 150 mmfd, ±5%, 500 wvdc. | Oscillator Tank | CM20C151J |
| C35 | CAPACITOR, variable: ceramic; 7-45 mmfd, 500 wvdc. | Osc Trimmer | CV11C450 |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C36 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Oscillator Grid Coupling | CC21SL470K |
| C37 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C38 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C39 | CAPACITOR, fixed: ceramic; 10 mmfd, ±1 mmfd, 500 wvdc. | Oscillator Injection | CC21SL100K |
| C40 | CAPACITOR, fixed: ceramic; 10 mmfd, ±1 mmfd, 500 wvdc. | HFO Output | CC21SL100K |
| C41 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C42 | CAPACITOR, fixed: ceramic; 120 mmfd, ±10%, 500 wvdc. | RF Bypass | CC-101-4 |
| C43 | CAPACITOR, variable: air dielectric, 3.2 to 50 mmfd, | Crystal Tuning | CT-104-1 |
| C44 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | RF Bypass | CC-100-16 |
| I1 | LAMP, incandescent: 6-8 volts, 250 ma DC, bayonet base. | Pilot Light | BI-101-44 |
| L1 | REACTOR, RF: two sect., 40 uh, Q of 60 at 2.5 Mcs, ±1.5 uhs. | Oscillator Coil | A-928 |
| P1 | CONNECTOR, multiple contact: 4 coaxial contacts and 8 noncoaxial female contacts. | RF Head Connector | PL-109 |
| R1 | RESISTOR, fixed: composition; 22 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF220K |
| R2 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Grid Bias | RC20GF474K |
| R3 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R4 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R5 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R6 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |
| R7 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |
| R8 | RESISTOR, fixed: composition; 2,700 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF272K |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R9 | RESISTOR, fixed: composition; 22 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF220K |
| R10 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Grid Bias | RC20GF474K |
| R11 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R12 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R13 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R14 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |
| R15 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |
| R16 | RESISTOR, fixed: composition; 2,700 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF272K |
| R17 | RESISTOR, fixed: composition; 22 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF220K |
| R18 | RESISTOR, fixed: composition; 2200 ohms, ±10%, 1/2 watt. | Mixer Cathode Resistor | RC20GF222K |
| R19 | RESISTOR, fixed: composition; 22,000 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF223K |
| R20 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1 watt. | Plate Decoupling | RC30GF473K |
| R21 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Reactance Tube Grid Resistor | RC20GF474K |
| R22 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Reactance Tube Grid Filter | RC20GF474K |
| R23 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Reactance Tube Grid Filter | RC20GF474K |
| R24 | RESISTOR, fixed: composition; 2,700 ohms, ±10%, 1/2 watt. | Reactance Tube Cathode Bias | RC20GF272K |
| R25 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1/2 watt. | Plate Load | RC20GF473K |
| R26 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1/2 watt. | Screen Resistor | RC20GF473K |
| R27 | RESISTOR, fixed: composition; 22 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF220K |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R28 | RESISTOR, fixed: composition; 22,000 ohms, ±10%, 1/2 watt. | Oscillator Grid Resistor | RC20GF223K |
| R29 | RESISTOR, fixed: composition; 120 ohms, ±10%, 1/2 watt. | Osc Cathode Bias | RC20GF121K |
| R30 | RESISTOR, fixed: composition; 39,000 ohms, ±10%, 1/2 watt. | Osc Plate Resistor | RC20GF393K |
| R31 | RESISTOR, fixed: composition; 39,000 ohms, ±10%, 1/2 watt. | Osc Screen Resistor | RC20GF393K |
| S1 | SWITCH, rotary: non-shorting; mycalex. | Function Switch | SW-100 |
| T1 | TRANSFORMER, RF: 485-515 Kcs., pri 9.3 uh, scdy 68 uh, uncased, ceramic form. | Antenna Trans | A-931 |
| T2 | TRANSFORMER, RF: 485-515 Kcs., pri 103 uh, scdy 68 uh, uncased, ceramic form. | Interstage Trans | A-929 |
| T3 | TRANSFORMER, RF: 485-515 Kcs., pri 103 uh, scdy 68 uh, uncased, ceramic form. | Mixer Trans | A930 |
| T4 | TRANSFORMER, IF: 455 Kcs. | 1st IF Trans | A-157 |
| V1 | TUBE, electron: 6AG5, min 7 pin. | 1st RF | 6AG5 |
| V2 | TUBE, electron: 6AG5, min 7 pin. | 2nd RF | 6AG5 |
| V3 | TUBE, electron: 6AU6, min 7 pin. | Mixer | 6AU6 |
| V4 | TUBE, electron: 6AG5, min 7 pin. | Reactance Mod | 6AG5 |
| V5 | TUBE, electron: 6AG5, min 7 pin. | Oscillator | 6AG5 |
| XI1 | SOCKET, min bay base; for T3-1/4 bulb; right angle, downturned. | Dial Light Socket | TS-107-2 |
| XV1, 2, 3, 4, 5. | SOCKET, tube: 7 pin min. | Socket, V1 | TS102P01 |
| XY1 | SOCKET, crystal: ceramic; .050'' spacing; .048'' pins. | Socket, Y1 | TS-104 |
| Y1 | CRYSTAL UNIT: quartz: 500 plus 455 Kcs., parallel resonant. (Supplied only on customer request.) | LF Crystal | CR-18/U |

## TUNING DRAWER, MODEL FFRD-5

TUNING DRAWER MODEL FFRD-5 (2-4 Mcs) IS SYMBOLIZED WITH SERIES 500 THROUGH 599 NUMBERS.

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C500 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C501 | CAPACITOR, variable: air dielectric; four sect. 10-135 mmfd each sect. | Frequency Tuning | CB-101 |
| C502 | CAPACITOR, variable: ceramic; 3-12 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11A120 |
| C503 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C504 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C505 | CAPACITOR, fixed: ceramic; 220 mmfd, ±10%, 500 wvdc. | Plate Tank | CC-101-3 |
| C506 | NOT USED | | |
| C507 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C508 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C509 | CAPACITOR, variable: ceramic; 3-12 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11A120 |
| C510 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C511 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | HF Screen Bypass | CC-100-16 |
| C512 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C513 | CAPACITOR, variable: ceramic; 3-12 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11A120 |
| C514 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C515 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C516 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C517 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF Tank | CM20D621G |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C518 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF Tank | CM20D621G |
| C519 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C520 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C521 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Reactance Tube Grid | CC-100-16 |
| C522 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C523 | CAPACITOR, variable: ceramic; 7-45 mmfd, 500 wvdc. | Reactance Tube Balance Control | CV11C450 |
| C524 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%; 500 wvdc. | Reactance Tube Screen Bypass | CC21SL470K |
| C525 | CAPACITOR, fixed: ceramic; 100 mmfd, ±10%, 500 wvdc. | Reactance Tube Coupling | CC26SL101K |
| C526 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C527 | CAPACITOR, variable: ceramic; 4-30 mmfd, 500 wvdc. | Oscillator Trimmer | CV11C300 |
| C528 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Oscillator Grid | CC21SL470K |
| C529 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C530 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C531 | CAPACITOR, fixed: ceramic; 120 mmfd, ±10%, 500 wvdc. | RF Bypass | CC-101-4 |
| C532 | CAPACITOR, variable: air dielectric; 3.2-50 mmfd. | Crystal Tuning | CT-104-1 |
| C533 | CAPACITOR, fixed: ceramic; 10 mmfd, ±.5 ,mmfd, 500 wvdc. | HFO Output | CC21SL100D |
| C534 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc.type. | Oscillator Plate Bypass | CC-100-16 |
| C535 | CAPACITOR, fixed: ceramic; 1.0 mmfd, ±0.5 mmfd, 500 wvdc. | Oscillator Injection | CC21SL010D |
| C536 | CAPACITOR, fixed: mica; 1,000 mmfd, ±2%, char. E, 500 wvdc. | Oscillator Padder | CM30E102G |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C537 | CAPACITOR, fixed: ceramic; 220 mmfd, ±10%, 500 wvdc. | Plate Tank | CC-101-3 |
| C538 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | RF Bypass | CC-100-16 |
| I500 | LAMP, incandescent: 6-8 volts, 250 ma DC, Bayonet Base. | Pilot Light | BI-101-44 |
| L501 | COIL, RF: fixed; 250 microhenries. | RF Choke | CL-108-2 |
| L502 | REACTOR, RF: 2 sect. 30 microhenries, Q of 40 at 2.5 Mcs, and 2.6 microhenries, Q of 30 at 7.9 Mcs. | Oscillator Tank | A-313 |
| P500 | CONNECTOR, multiple contact: 4 coaxial contacts and 8 non-coaxial contacts. | RF Head Connector | PL-109 |
| R500 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R501 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R502 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R503 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Screen Parasitic Suppressor | RC20GF100K |
| R504 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |
| R505 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |
| R506 | RESISTOR, fixed: composition; 27,000 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF273K |
| R507 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R508 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R509 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R510 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Screen Parasitic Suppressor | RC20GF100K |
| R511 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |
| R512 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R513 | RESISTOR, fixed: composition; 27,000 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF273K |
| R514 | RESISTOR, NETWORK: fixed: composition; 5 ohms, ±10%, 1/2 watt (Consists of two 10 ohm resistors in parallel). | Parasitic Suppressor | |
| R514A* | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R514B* | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R515 | RESISTOR, fixed: composition; 820 ohms, ±10%, 1/2 watt. | Mixer Cathode Bias | RC20GF821K |
| R516 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1 watt. | Plate Decoupling | RC30GF473K |
| R517 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Reactance Tube Grid Resistor | RC20GF474K |
| R518 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Reactance Tube Grid Filter | RC20GF474K |
| R519 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Reactance Tube Grid Filter | RC20GF474K |
| R520 | RESISTOR, fixed: composition; 4700 ohms, ±10%; 1/2 watt. | Reactance Tube Cathode Bias | RC20GF472K |
| R521 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1/2 watt. | Reactance Tube Screen Resistor | RC20GF473K |
| R522 | NOT USED. | | |
| R523 | RESISTOR, fixed: composition; 22 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF220K |
| R524 | RESISTOR, fixed: composition; 22,000 ohms, ±10%, 1/2 watt. | Oscillator Grid Resistor | RC20GF223K |
| R525 | RESISTOR, fixed: composition; 120 ohms, ±10%, 1/2 watt. | Oscillator Cathode Bias | RC20GF121K |
| R526 | RESISTOR, fixed: composition; 39,000 ohms, ±10%, 1/2 watt. | Oscillator Screen Resistor | RC20GF393K |
| R527 | RESISTOR, fixed: composition; 39,000 ohms, ±10%, 1/2 watt. | Oscillator Plate Resistor | RC20GF393K |
| S500 | SWITCH, rotary: non-shorting; mycalex insulation, two pole, three position. | Slave, Master Xtal Operational Switch | SW-100 |
| T500 | TRANSFORMER, RF: 2-4 Mcs, pri. 2.7 ohms, secdy 13.8 ohms, C.T. | Antenna Transformer | A-314 |

* Listed for reference only.

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| T501 | TRANSFORMER, RF: 2-4 Mcs, pri. 24.8 ohms, secdy 18.8 ohms, C.T. | Interstage Transformer | A-312 |
| T502 | TRANSFORMER, RF: 2-4 Mcs, pri 24.8 ohms, secdy 18.8 ohms, C.T. | Mixer Transformer | A-315 |
| T503 | TRANSFORMER, IF: 455 Kcs. | IF Transformer | A-157 |
| V500 | TUBE, electron: 6AG5, miniature 7 pin. | First RF | 6AG5 |
| V501 | TUBE, electron: 6AG5, miniature 7 pin. | Second RF | 6AG5 |
| V502 | TUBE, electron: 6AU6, miniature 7 pin. | Mixer | 6AU6 |
| V503 | TUBE, electron: 6AG5, miniature 7 pin. | Reactance Tube | 6AG5 |
| V504 | TUBE, electron: 6AG5, miniature 7 pin. | HF Osc. | 6AG5 |
| XI500 | SOCKET, min. bayonet base: T-3-1/4 bulb bulb; right angle, downturned, short, hole size 5/32 inches, 1-3/8 in. lg. x 7/16 in. wd. o/a. | Lamp Socket | TS-107-2 |
| XV500 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XV501 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XV502 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XV503 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XV504 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XY500 | SOCKET, ceramic. | Xtal Socket | TS-104-1 |
| Y500 | CRYSTAL UNIT, quartz: 2-4 Mcs (supplied only on customers request) | | CR-16/U |

## TUNING DRAWER, MODEL FFRD-6

TUNING DRAWER, MODEL FFRD-6 (4-8 Mcs) IS SYMBOLIZED WITH SERIES 600 THROUGH 699 NUMBERS.

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C600 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C601 | CAPACITOR, variable: air dielectric, four sect. 10-135 mmfd each sect. | Frequency Tuning | CB-101 |
| C602 | CAPACITOR, variable: ceramic; 3-12 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11A120 |
| C603 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C604 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C605 | CAPACITOR, fixed: ceramic; 150 mmfd, ±10%, 500 wvdc. | Plate Tank | CC-101-2 |
| C606 | NOT USED | | |
| C607 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C608 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C609 | CAPACITOR, variable: ceramic; 3-12 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11A120 |
| C610 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C611 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | HF Screen Bypass | CC-100-16 |
| C612 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C613 | CAPACITOR, variable: ceramic; 3-12 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11A120 |
| C614 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C615 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C616 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C617 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF Tank | CM20D621G |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C618 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF Tank | CM20D621G |
| C619 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C620 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C621 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C622 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C623 | CAPACITOR, variable: ceramic; 7-45 mmfd, 500 wvdc. | Reactance Tube Balance Control | CV11C450 |
| C624 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Reactance Tube Screen Bypass | CC21SL470K |
| C625 | CAPACITOR, fixed: ceramic; 200 mmfd, ±20%, 500 wvdc. | Reactance Tube Coupling | CC-101-7 |
| C626 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C627 | CAPACITOR, variable: ceramic; 4-30 mmfd, 500 wvdc. | Osc. Trimmer | CV11C300 |
| C628 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Osc. Grid Coupling | CC21SL470K |
| C629 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C630 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C631 | CAPACITOR, fixed: ceramic; 120 mmfd, ±10%, 500 wvdc. | RF Bypass | CC-101-4 |
| C632 | CAPACITOR, variable: air dielectric, 3.2-50 mmfd. | Crystal Tuning | CT-104-1 |
| C633 | CAPACITOR, fixed: ceramic; 10 mmfd, ±.5 mmfd, 500 wvdc. | HFO Output | CC21SL100D |
| C634 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | Osc. Plate Bypass | CC-100-16 |
| C635 | CAPACITOR, fixed: ceramic; 1.5 mmfd, ±.25 mmfd, 500 wvdc. | Osc. Injection | CC21SL1R5C |
| C636 | CAPACITOR, fixed: mica; 1500 mmfd, ±2%, char. E, 500 wvdc. | Osc. Padder | CM30E152G |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C637 | CAPACITOR, fixed: ceramic; 150 mmfd, ±10%, 500 wvdc. | Plate Tank | CC-101-2 |
| C638 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | RF Bypass | CC-100-16 |
| I600 | LAMP, incandescent: 6-8 volts; 250 ma DC, Bayonet Base | Pilot Light | BI-101-44 |
| L601 | Coil, rf: fixed; 250 microhenries. | RF Choke | CL-108-8 |
| L602 | REACTOR, rf: 3 sect; sec. #1: L of 7.7 microhenries, Q of 78 at 7.9 Mcs, Sec. #2: L of 1.7 microhenries, Q of 44 at 7.9 Mcs, Sec. #3: L 0f 4.2 microhenries, Q of 57 at 7.9 Mcs. | Osc. Tank | A-297 |
| P600 | CONNECTOR, multiple contact: 4 coaxial contacts and 8 non-coaxial contacts. | RF Head Connector | PL-109 |
| R600 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R601 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R602 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R603 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Screen Parasitic Suppressor | RC20GF100K |
| R604 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |
| R605 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |
| R606 | RESISTOR, fixed: composition; 27,000 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF273K |
| R607 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R608 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R609 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R610 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Screen Parasitic Suppressor | RC20GF100K |
| R611 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R612 | RESISTOR, fixed: composition; 1000,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |
| R613 | RESISTOR, fixed: composition; 27,000 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF273K |
| R614 | RESISTOR, NETWORK: fixed: composition; 5 ohms, ±10%, 1/2 watt. (Consists of two 10 ohm resistors in parallel). | Parasitic Suppressor | RC20GF100K |
| R614A* | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R614B* | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R615 | RESISTOR, fixed: composition; 820 ohms, ±10%, 1/2 watt. | Mixer Cathode Bias | RC20GF821K |
| R616 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1 watt. | Plate Decoupling | RC30GF473K |
| R617 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Reactance Tube Grid Resistor | RC20GF474K |
| R618 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Reactance Tube Grid Filter | RC20GF474K |
| R619 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Reactance Tube Grid Filter | RC20GF474K |
| R620 | RESISTOR, fixed: composition; 3900 ohms, ±10%, 1/2 watt. | Reactance Tube Cathode Bias | RC20GF392K |
| R621 | RESISTOR, fixed: composition; 47,000 ohms, ±105, 1/2 watt. | Reactance Tube Screen Resistor | RC20GF473K |
| R622 | NOT USED. | | |
| R623 | RESISTOR, fixed: composition; 22 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF220K |
| R624 | RESISTOR, fixed: composition; 22,000 ohms, ±10%, 1/2 watt. | Osc. Grid Resistor | RC20GF223K |
| R625 | RESISTOR, fixed: composition; 120 ohms, ±10%, 1/2 watt. | Osc. Cathode Bias | RC20GF121K |
| R626 | RESISTOR, fixed: composition; 39,000 ohms, ±10%, 1/2 watt. | Osc. Screen Resistor | RC20GF393K |
| R627 | RESISTOR, fixed: composition; 39,000 ohms, ±10%, 1/2 watt. | Osc. Plate Resistor | RC20GF393K |

*Listed for reference only.

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| S600 | SWITCH, rotary: non-shorting; mycalex insulation, two pole, three position. | Slave, Master Xtal Operational Switch | SW-100 |
| T600 | TRANSFORMER, RF: 4-8 Mcs; pri L of 4 microhenries, Q of 75 at 7.9 Mcs, sec. L of 10.5 microhenries, Q of 58 at 7.9 Mcs. | Antenna Transformer | A-298 |
| T601 | TRANSFORMER, RF: 4-8 Mcs; pri L of 50 microhenries, Q of 40 at 2.5 Mc, sec L of 10.5 microhenries, Q of 58 at 7.9 Mc. | Interstage RF Transformer | A-296 |
| T602 | TRANSFORMER, RF: 4-8 Mcs; pri L of 50 microhenries, Q of 40 at 2.5 Mc, L of 10.5 microhenries, Q of 58 at 7.9 Mc. | Mixer Transformer | A-299 |
| T603 | TRANSFORMER, IF: 455 Kcs. | IF Transformer | A-157 |
| V600 | TUBE, electron: 6AG5, miniature 7 pin. | First RF | 6AG5 |
| V601 | TUBE, electron: 6AG5, miniature 7 pin. | Second RF | 6AG5 |
| V602 | TUBE, electron: 6AU6, miniature 7 pin. | Mixer | 6AU6 |
| V603 | TUBE, electron: 6AG5, miniature 7 pin. | Reactance Tube | 6AG5 |
| V604 | TUBE, electron: 6AG5, miniature 7 pin. | HF Osc. | 6AG5 |
| XI600 | SOCKET, min. bayonet base: T-3-1/4 bulb; right angle, downturned, short, hole size 5/32 inches, 1-3/8 in. lg. x 7/16 in. wd. o/a. | Lamp Socket | TS-107-2 |
| XV600 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XV601 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XV602 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XV603 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XV604 | SOCKET, tube: 7 pin miniature. | Tube Socket | TS102P01 |
| XY600 | SOCKET, ceramic. | Xtal Socket | TS-104-1 |
| Y600 | CRYSTAL UNIT, quartz: 4-8 Mcs. (supplied only on customers request). | | CR-18/U |

## TUNING DRAWER, MODEL FFRD-7

TUNING DRAWER, MODEL FFRD-7 (8-16 Mcs) IS SYMBOLIZED WITH SERIES 700 THROUGH 799 NUMBERS.

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C700 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C701 | CAPACITOR, variable: air; 4 sect. 10-135 mmfd, each sect. | Frequency Tuning | CB-101 |
| C702 | CAPACITOR, variable: ceramic; 4-30 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11C300 |
| C703 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C704 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C705 | CAPACITOR, fixed: ceramic; 22 mmfd, ±10%, 500 wvdc. | Plate Tank | CC21SL220K |
| C706 | NOT USED | | |
| C707 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C708 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C709 | CAPACITOR, variable: ceramic; 4-30 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11C300 |
| C710 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C711 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C712 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C713 | CAPACITOR, variable: ceramic; 4-30 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11C300 |
| C714 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C715 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C716 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C717 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, Char. D, 500 wvdc. | Part of IF Tank | CM20D621G |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C718 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF Tank | CM20D621G |
| C719 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C720 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C721 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C722 | CAPACITOR, fixed: ceramic; .01 mfd, ±20%, 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C723 | CAPACITOR, variable: ceramic; 3-12 mmfd, 500 wvdc. | Reactance Tube Balance Control | CV11A120 |
| C724 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Screen Bypass | CC21SL470K |
| C725 | CAPACITOR, fixed: ceramic; 68 mmfd, ±10%, 500 wvdc. | Reactance Tube Coupling | CC-101-5 |
| C726 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C727 | CAPACITOR, variable: ceramic; 4-30 mmfd, 500 wvdc. | Osc. Trimmer | CV11C300 |
| C728 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Osc. Grid Coupling | CC21SL470K |
| C729 | CAPACITOR, fixed: ceramic; .01 mfd, ±20%, 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C730 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C731 | CAPACITOR, fixed: ceramic; 120 mmfd, ±10%, 500 wvdc. | HFO Output | CC-101-4 |
| C732 | CAPACITOR, variable: air dielectric; 3.2 - 50 mmfd, 500 wvdc. | Crystal Tuning | CT-104-1 |
| C733 | CAPACITOR, fixed: ceramic; 10 mmfd, ± .5 mmfd, 500 wvdc. | HFO Output | CC21SL100D |
| C734 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Osc. Plate Bypass | CC-100-16 |
| C735 | CAPACITOR, fixed: ceramic; 1 mmfd, ±.25 mmfd, 500 wvdc. | Osc. Injection | CC21SL010C |
| C736 | CAPACITOR, fixed: mica; 2200 mmfd, ±2%, char. E, 500 wvdc. | Osc. Padder | CM30E222G |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C737 | CAPACITOR, fixed: ceramic; 22 mmfd, ±10%, 500 wvdc. | Plate Tank | CC21SL220K |
| C738 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | RF Bypass | CC-100-16 |
| I700 | LAMP, incandescent: 6-8 volts; 250 ma. DC, Bayonet Base. | Pilot Light | BI-101-44 |
| L701 | COIL, RF: fixed; 250 microhenries. | Reactance Tube Plate Load | CL-108-2 |
| L702 | COIL, RF: 3 sections; sec #1: L of .352 microhenries, Q of 86 at 25 Mcs, sec. #2: L of 1.14 microhenries, Q of 114 at 25 Mcs, sec #3: L of 2.1 microhenries, Q of 114 at 7.9 Mcs. | Osc. Tank | A-305 |
| P700 | CONNECTOR, multiple contact: 4 coaxial & 8 non-coaxial contacts. | RF Head Connector | PL-109 |
| R700 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R701 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R702 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R703 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Screen Parasitic Suppressor | RC20GF100K |
| R704 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |
| R705 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |
| R706 | RESISTOR, fixed: composition; 27,000 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF273K |
| R707 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R708 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R709 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R710 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Screen Parasitic Suppressor | RC20GF100K |
| R711 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |
| R712 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R713 | RESISTOR, fixed: composition; 27,000 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF273K |
| R714 | Not Used. | | |
| R715 | RESISTOR, fixed: composition; 820 ohms, ±10%, 1/2 watt. | Mixer Cathode Bias | RC20GF821K |
| R716 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1 watt. | Plate Decoupling | RC30GF473K |
| R717 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Reactance Tube Grid Resistor | RC20GF474K |
| R718 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Reactance Tube Grid Filter | RC20GF474K |
| R719 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Reactance Tube Grid Filter | RC20GF474K |
| R720 | RESISTOR, fixed: composition; 3300 ohms, ±5%, 1/2 watt. | Reactance Tube Cathode Bias | RC20GF332J |
| R721 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1/2 watt. | Reactance Tube Screen Resistor | RC20GF473K |
| R722 | Not Used. | | |
| R723 | RESISTOR, fixed: composition; 22 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF220K |
| R724 | RESISTOR, fixed: composition; 22,000 ohms, ±10%, 1/2 watt. | Osc. Grid Leak | RC20GF223K |
| R725 | RESISTOR, fixed: composition; 120 ohms, ±10%, 1/2 watt. | Osc. Cathode Bias | RC20GF121K |
| R726 | RESISTOR, fixed: composition; 39,000 ohms, ±10%, 1/2 watt. | Osc. Screen Resistor | RC20GF393K |
| R727 | RESISTOR, fixed: composition; 39,000 ohms, ±10%, 1/2 watt. | Osc. Plate Resistor | RC20GF393K |
| R728 | RESISTOR, fixed: composition; 130 ohms, ±5%, 1/2 watt. | Mixer Cathode Res. | RC20GF131J |
| S700 | SWITCH, rotary: non-shorting; mycalex insulation, two pole, three position. | Slave, Master Xtal Operational Switch | SW-100 |
| T700 | TRANSFORMER, RF: 8-16 Mcs; pri .59 ohms, sec .87 ohms. | Antenna Coil | A-306 |
| T701 | TRANSFORMER, RF: 8-16 Mcs; pri 20.6 ohms, sec 1.26 ohms. | Interstage RF Transformer | A-304 |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| T702 | TRANSFORMER, IF: 8-16 Mcs; pri 20.6 ohms, sec 1.26 ohms. | Mixer Transformer | A-307 |
| T703 | TRANSFORMER, IF: 455 Kcs. | IF Transformer | A-157 |
| V700 | TUBE, electron: 6AG5; miniature 7 pin. | First RF | 6AG5 |
| V701 | TUBE, electron: 6AG5; miniature 7 pin. | Second RF | 6AG5 |
| V702 | TUBE, electron: 6AU6; miniature 7 pin. | Mixer | 6AU6 |
| V703 | TUBE, electron: 6AG5; miniature 7 pin. | Reactance Tube | 6AG5 |
| V704 | TUBE, electron: 6AG5; miniature 7 pin. | HF Oscillator | 6AG5 |
| XI700 | SOCKET, min. bayonet base: T-3-1/4 bulb; right angle, downturned, short, hole size 5/32 inches, 1-3/8 in. lg x 7/16 in. wd. o/a. | Lamp Socket | TS-107-2 |
| XV700 | SOCKET, tube: 7 pin miniature. | Electron Tube Socket | TS102P01 |
| XV701 | SOCKET, tube: 7 pin miniature. | Electron Tube Socket | TS102P01 |
| XV702 | SOCKET, tube: 7 pin miniature. | Electron Tube Socket | TS102P01 |
| XV703 | SOCKET, tube: 7 pin miniature. | Electron Tube Socket | TS102P01 |
| XV704 | SOCKET, tube: 7 pin miniature. | Electron Tube Socket | TS102P01 |
| XY700 | SOCKET, ceramic. | Xtal Socket | TS-104-1 |
| Y700 | CRYSTAL UNIT, quartz: 8-16 Mcs. (supplied only on customers request). | HFO Crystal | CR-18/U |

TUNING DRAWER, MODEL FFRD-8

TUNING DRAWER, MODEL FFRD-8 (16-32 Mcs.) IS SYMBOLIZED WITH SERIES 800 THROUGH 899 NUMBERS.

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C800 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C801 | CAPACITOR, variable: air dielectric, four sect, 10-135 mmfd, each sect. | Frequency Tuning | CB-101 |
| C802 | CAPACITOR, variable: ceramic; 4-30 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11C300 |
| C803 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C804 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C805 | CAPACITOR, fixed: ceramic; 12 mmfd, ±10%, 500 wvdc. | Plate Tank | CC21SL120K |
| C806 | CAPACITOR, fixed: ceramic; 2.5 mmfd, ±.25 mmfd, 500 wvdc. | RF Coupling | CC-101-1 |
| C807 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C808 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | AVC Decoupling | CC-100-16 |
| C809 | CAPACITOR, variable: ceramic; 4-30 mmfd, 500 wvdc. | High Frequency Band Adjustment | CV11C300 |
| C810 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C811 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | HF Screen Bypass | CC-100-16 |
| C812 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C813 | CAPACITOR, variable: ceramic; 4-30 mmfd, 500 wvdc. | High Frequency Band | CV11C300 |
| C814 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C815 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C816 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Filament Bypass | CC-100-16 |
| C817 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, Char. D, 500 wvdc. | Part of IF Tank | CM20D621G |

| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C818 | CAPACITOR, fixed: mica; 620 mmfd, ±2%, char. D, 500 wvdc. | Part of IF Tank | CM20D621G |
| C819 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C820 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C821 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C822 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Reactance Tube Grid Filter | CC-100-16 |
| C823 | CAPACITOR, variable: ceramic; 3-12 mmfd, 500 wvdc. | Reactance Tube Balance Control | CV11A120 |
| C824 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Reactance Tube Screen Bypass | CC21SL470K |
| C825 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Reactance Tube Coupling | CC21SL470K |
| C826 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Plate Decoupling | CC-100-16 |
| C827 | CAPACITOR, variable: ceramic; 1.5-7 mmfd, 500 wvdc. | Oscillator Trimmer | CV11C070 |
| C828 | CAPACITOR, fixed: ceramic; 47 mmfd, ±10%, 500 wvdc. | Oscillator Grid Coupling | CC21SL470K |
| C829 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Cathode Bypass | CC-100-16 |
| C830 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Screen Bypass | CC-100-16 |
| C831 | CAPACITOR, fixed: ceramic; 120 mmfd, ±10%, 500 wvdc. | RF Bypass | CC-101-4 |
| C832 | CAPACITOR, variable: air dielectric; 3.2-50 mmfd. | Crystal Tuning | CT104-1 |
| C833 | CAPACITOR, fixed: ceramic; 10 mmfd, ±.5 mmfd, 500 wvdc. | HFO Output | CC21SL100D |
| C834 | CAPACITOR, fixed: ceramic; .01 mfd, (GMC), 500 wvdc, disc type. | Oscplate Bypass | CC-100-16 |
| C835 | CAPACITOR, fixed: ceramic; 1.5 mmfd, ±.25 mmfd, 500 wvdc. | Osc. Injection | CC21SL1R5C |
| C836 | CAPACITOR, fixed: mica; 1300 mmfd, ±2%, char. E, 500 wvdc. | Osc. Padder | CM30E132G |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| C837 | NOT USED | | |
| C838 | CAPACITOR, fixed: ceramic; .01 mfd, 500 wvdc, disc type. | R.F. Bypass | CC-100-16 |
| I800 | LAMP, incandescent: 6-8 volts; 250 ma DC, Bayonet Base. | Pilot Light | BI-101-44 |
| L800 | INDUCTOR, fixed: 5.6 microhenries. | Osc. Plate Load | A-241 |
| L801 | COIL, RF: fixed; 200 microhenries. | Reactance tube Plate Load | CL-108-6 |
| P800 | CONNECTOR, multiple contact: 4 coaxial contacts and 8 non-coaxial contacts. | RF Head Connector | PL-109 |
| R800 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R801 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R802 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R803 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Screen Parasitic | RC20GF100K |
| R804 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |
| R805 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |
| R806 | RESISTOR, fixed: composition; 27,000 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF273K |
| R807 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | AVC Filter | RC20GF104K |
| R808 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R809 | RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt. | Cathode Bias | RC20GF221K |
| R810 | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Screen Parasitic | RC20GF100K |
| R811 | RESISTOR, fixed: composition; 220,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF224K |
| R812 | RESISTOR, fixed: composition; 100,000 ohms, ±10%, 1/2 watt. | Part of Screen Voltage Divider | RC20GF104K |
| R813 | RESISTOR, fixed: composition; 27,000 ohms, ±10%, 2 watts. | Plate Decoupling | RC42GF273K |

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| R814 | RESISTOR, NETWORK: fixed; composition; 5 ohms, ±10%, 1/2 watt. (Consists of two 10 ohm resistors in parallel). | Parasitic Suppressor | RC20GF100K |
| R814A* | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R814B* | RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF100K |
| R815 | RESISTOR, fixed: composition; 820 ohms, ±10%, 1/2 watt. | Mixer Cathode Bias | RC20GF821K |
| R816 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1 watt. | Plate Decoupling | RC30GF473K |
| R817 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Reactance Tube Grid Resistor | RC20GF474K |
| R818 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Reactance Tube Grid Filter | RC20GF474K |
| R819 | RESISTOR, fixed: composition; 470,000 ohms, ±10%, 1/2 watt. | Part of Reactance Tube Grid Filter | RC20GF474K |
| R820 | RESISTOR, fixed: composition; 1500 ohms, ±10%, 1/2 watt. | Reactance Tube Cathode Bias | RC20GF152K |
| R821 | RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1/2 watt. | Reactance Tube Screen Resistor | RC20GF473K |
| R822 | NOT USED. | | |
| R823 | RESISTOR, fixed: composition; 22 ohms, ±10%, 1/2 watt. | Parasitic Suppressor | RC20GF220K |
| R824 | RESISTOR, fixed: composition; 22,000 ohms, ±5%, 1/2 watt. | Oscillator Grid Resistor | RC20GF223J |
| R825 | RESISTOR, fixed: composition; 120 ohms, ±5%, 1/2 watt. | Oscillator Cathode Bias | RC20GF121J |
| R826 | RESISTOR, fixed: composition; 22,000 ohms, ±5%, 1/2 watt. | Oscillator Screen Resistor | RC20GF223J |
| R827 | RESISTOR, fixed: composition; 120 ohms, ±5%, 1/2 watt. | Oscillator Plate Resistor | RC20GF121J |
| R828 | RESISTOR, fixed: composition; 130 ohms, ±5%, 1/2 watt. | Cathode Res. | RC20GF131J |
| S800 | SWITCH, rotary: non-shorting; mycalex insulation two pole, three position. | Slave, Master Xtal Operational Switch | SW-100 |

*Listed for reference only.

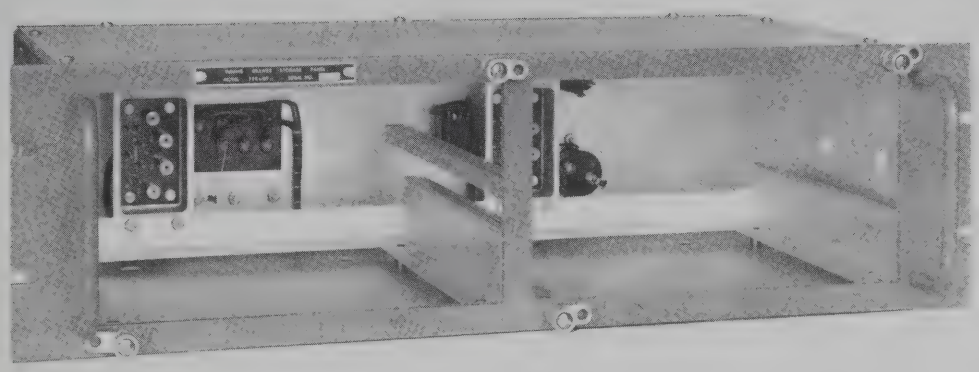
| SYM. | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| T800 | TRANSFORMER, RF: 16-32 Mcs; pri 1.236 microhenries, secdy .58 microhenries. | Antenna Transformer | A-177 |
| T801 | TRANSFORMER, RF: 16-32 Mcs; pri 3.8 ohms, secdy 1.15 ohms, C.T. | Interstage RF Transformer | A-198 |
| T802 | TRANSFORMER, RF: 16-32 Mcs, pri 1.3 ohms, secdy .59 ohms. | Mixer Transformer | A-194 |
| T803 | TRANSFORMER, IF: 455 Kcs. | IF Transformer | A-157 |
| T804 | TRANSFORMER, RF: 16-32 Mcs; pri 1.57 ohms, secdy .63 ohms. | Osc. Transformer | A-175 |
| V800 | TUBE, electron: 6AK5; miniature 7 pin. | First RF | 6AK5 |
| V801 | TUBE, electron: 6AK5; miniature 7 pin. | Second RF | 6AK5 |
| V802 | TUBE, electron: 6AU6; miniature 7 pin. | Mixer | 6AU6 |
| V803 | TUBE, electron: 6AG5; miniature 7 pin. | Reactance Tube | 6AG5 |
| V804 | TUBE, electron: 6AK5; miniature 7 pin. | HF Oscillator | 6AK5 |
| VI800 | SOCKET, min. bayonet base: bulb T-3-1/4; right angle, downturned, short, hole size 5/32 inches, 1-3/8'' lg x 9/16'' wd. o/a. | Lamp Socket | TS-107-2 |
| XV800<br>XV801<br>XV802<br>XV803<br>XV804 | SOCKET, tube: 7 pin miniature. | Electron Tube Sockets | TS102P01 |
| XY800 | SOCKET, ceramic. | Xtal Socket | TS-104-1 |
| Y800 | CRYSTAL UNIT, quartz: 16-32 Mcs. (Supplied only on customer request). | | CR-18/U |

INSTRUCTION SHEET

# TUNING DRAWER STORAGE PANEL

# MODEL FFR–DPH

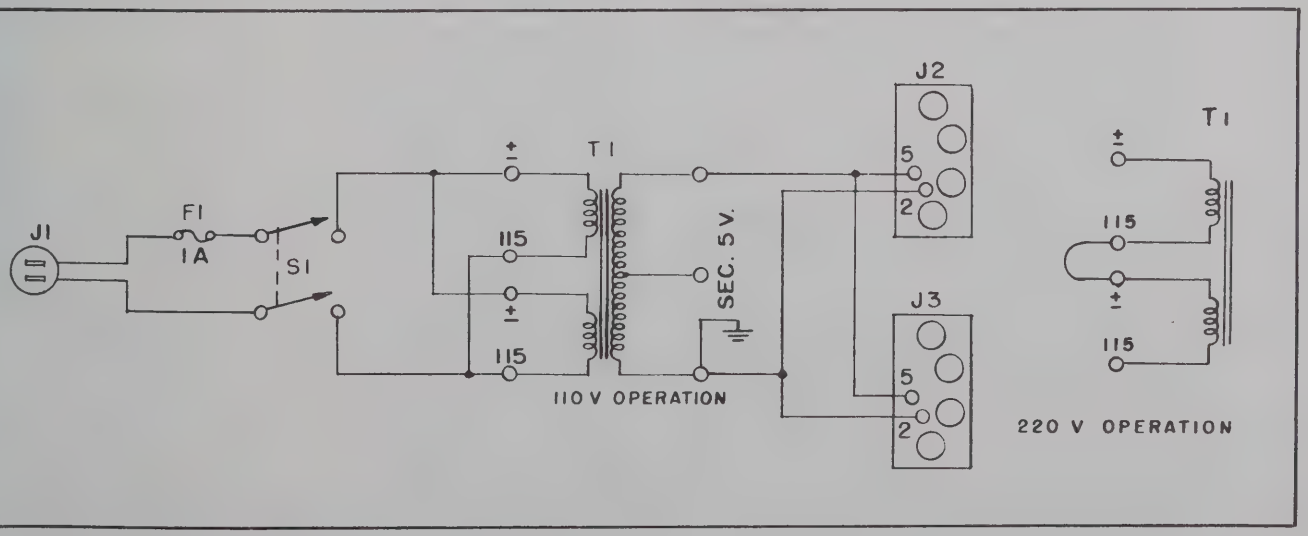
**CY-5045A/FFR-502**

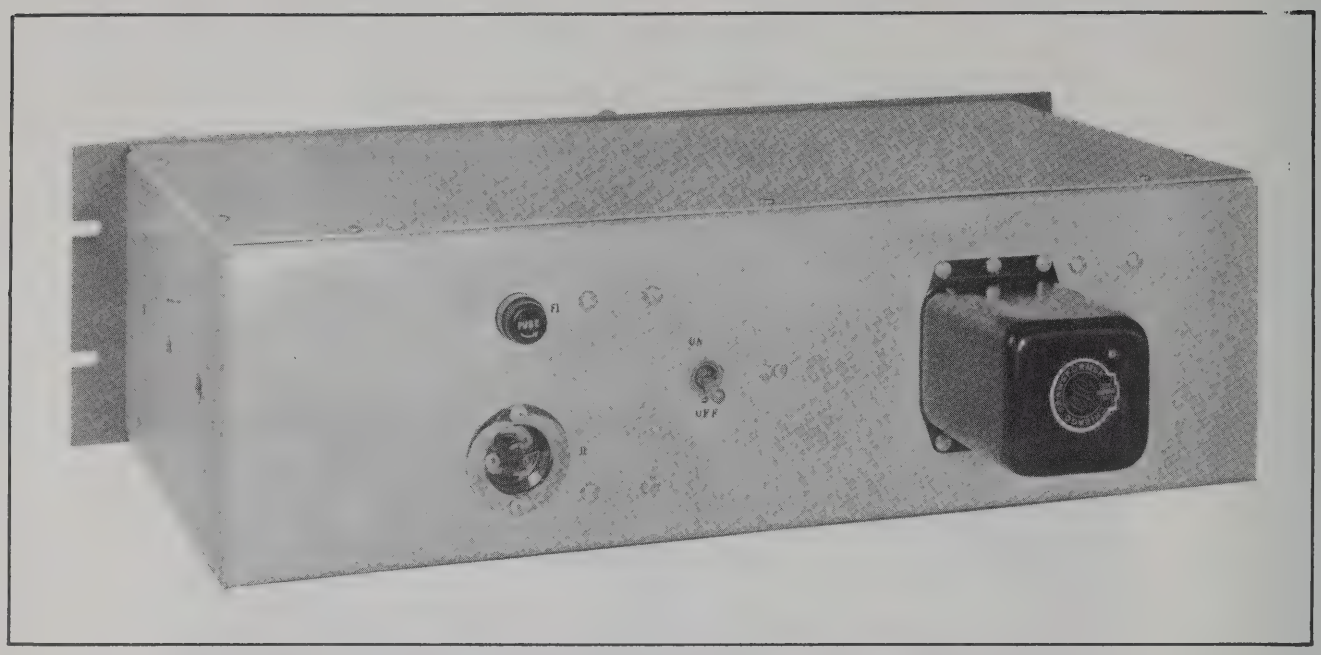


The TMC Model FFR-DPH, Tuning Drawer Storage Panel is designed to provide a safe and convenient method of storing and pre-heating the filaments of the TMC Model FFRD-*, Tuning Drawers while not in operation.

The unit is designed to operate from a 110 volts A.C. 50/60 cycles source, unless it is specifically ordered for 220 volts 50/60 cycles. The unit is normally shipped from the factory wired for 110 volts A.C. operation, However, a simple wiring change in the tapped primary of the filament power transformer is necessary to change the Model FFR-DPH for 220 volts A.C. operation. This change is made directly on the transformer terminal lugs as described in the schematic diagram.

Once the tuning drawers have been installed in the panel, it is only necessary to turn the filament power switch (located on the rear chassis) "ON". The dial lights on the tuning drawers should light indicating power present in the unit.





TUNING DRAWER STORAGE PANEL, MODEL FFR-DPH

The suffix H after FFR-DP denotes use of filament supply.

MODEL FFR-DPH IS SYMBOLIZED WITH SERIES 1 THROUGH 99 NUMBERS.

| SYM | DESCRIPTION | FUNCTION | TMC PART NO. |
|---|---|---|---|
| F1 | FUSE, cartridge: 1 amp. | Line Fuse | FU-100-1.0 |
| J1 | CONNECTOR, assembly: male contact; flush motor plug type. | AC Input | JJ-100 |
| J2 | CONNECTOR, multiple contact: four coaxial female contacts; eight non-coaxial male contacts. | Filament Voltage Connector | JJ-104 |
| J3 | CONNECTOR, multiple contact: four coaxial female contacts; eight non-coaxial male contacts. | Filament Voltage Connector | JJ-104 |
| S1 | SWITCH, toggle: DPST; 3 amp, 250 volts, phenolic body. | Filament On/Off | ST22K |
| T1 | TRANSFORMER, filament: input 110/220 volts, 50/60 cycle, single phase, output 5 volts @ 4 amps. | Filament Transformer | TF-153 |
| W1 | CABLE ASSEMBLY, power: female twist-lock type plug one end, non-polarized male plug opposite end. | AC Line Cord | CA-103 |
| XF1 | HOLDER, fuse: extractor post type; for single AGC fuse. | Fuse Socket | FH-100-2 |

# STOCK NUMBER IDENTIFICATION

RECEIVER SUBASSEMBLY R-5007/FRR-502

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| C100 | | N16-C064062-6985 | | 3330-313-334-199 |
| C101,102,103, 106,107,108, 110,113,114, 115,122,125, 139,140,143, 146,154 | | *N16-C019139-8871 | | 3330-055-475-243 |
| C104,105,111, 112,116,117 | | *N16-C030367-9395 | | 3330-055-950-292 |
| C109 | | *N16-C015980-8561 | | 3330-055-350-320 |
| C118,121 | | N16-C017085-7060 | | 3330-313-889-919 |
| C119 | | N16-C016596-2514 | | 3330-313-584-175 |
| C120 | | N16-C053683-4665 | | |
| C123,129,130, 152 | | *N16-C055872-1577 | | 3330-052-251-095 |
| C127,133 | | N16-C019010-8091 | | 3330-055-425-267 |
| C128 | | *N16-C048817-2795 | | |
| C131 | | *N16-C016140-8561 | | 3330-055-350-214 |
| C132 | | *N16-C018659-7522 | | 3330-055-475-268 |
| C134 | | N16-C017218-8281 | | 3330-055-475-266 |
| C135,142 | | N16-C017406-7214 | | 3330-055-475-238 |
| C136 | | N16-C030183-3521 | | |
| C137 | | N16-C058469-5910 | | 3330-058-050-001 |
| C138 | | N16-C016541-7014 | | 3330-313-430-240 |
| C141 | | N16-C016276-2514 | | 3330-055-350-183 |
| C144 | | N16-C015916-9005 | | 3330-055-350-095 |
| C145 | | N16-C015628-9005 | | 3330-312-860-711 |
| C147 | | N16-C053192-8190 | | 3330-317-760-196 |
| C148,149,150 | | *N16-C049958-5179 | | 3330-317-643-027 |
| C151 | | N16-C019788-8858 | | 3330-055-725-159 |
| C153,157,158 | | N16-C019238-9510 | | 3330-055-475-378 |
| C155,156 | | N16-C030144-4271 | | 3330-326-034-200 |
| E100 | | *N17-B077585-4501 | | 8880-500-308-3255 |
| E101,102 | | N17-B077840-1659 | | 8880-500-808-3755 |
| F100 | | G17-F016302-0100 | | |
| I100 | | *G17-L006305-0000 | | |
| J100,101,102, 103,104 | | N17-C073108-7477 | | |
| J105 | | N17-C073185-1208 | | 8850-530-900 |
| J106 | | N17-J039248-4418 | | 8850-749-430 |
| J107 | | N17-C073583-3424 | | 8850-753-180 |
| J108 | | *N17-C073428-3259 | | 8850-508-172 |
| J109 | | N17-C073108-5890 | | |
| L100,101 | | N16-R029318-5633 | | 3340-062-454-170 |
| L102,104 | | N16-C071597-2121 | | 3340-060-709-470 |
| L103 | | N17-T073847-5951 | | |
| R100 | | N16-R050741-0818 | | |
| R101,106,110 | | N16-R049661-0818 | | 3350-103-000-1921 |
| R102,107,111 | | N16-R050633-0785 | | |
| R103,108,112 | | N16-R050552-0818 | | 3350-098-000-5291 |
| R104,109,113, 122 | | N16-R050012-0816 | | 3350-103-000-3516 |
| R105,137 | | N16-R050416-0435 | | |
| R114,144,146 | | N16-R050200-0438 | | 3350-103-000-4541 |

#Indicates: Low failure item - if required requisition from ESO referencing NAVSHIPS 900,180A.
*Indicates: "For replacement use SNSN-"

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| R115 | | N16-R050740-0380 | | |
| R116,117 | | N16-R050993-0818 | | 3350-103-000-7786 |
| R118,120,125, 129,130,131 | | N16-R050822-0761 | | 3350-103-000-7416 |
| R119,139 | | N16-R050479-0440 | | 3350-103-000-5461 |
| R121 | | N16-R088342-5572 | | 3350-794-500-8947 |
| R123,124,132, 141 | | N16-R050651-0818 | | 3350-103-000-5928 |
| R126 | | N16-R049786-0701 | | 3350-133-000-1596 |
| R127 | | N17-R049968-0525 | | |
| R128 | | N16-R050092-0438 | | 3350-103-000-3856 |
| R133 | | N16-R050587-0435 | | |
| R134 | | N16-R049643-0818 | | |
| R135 | | N16-R049921-0349 | | |
| R136 | | N16-R087419-4625 | | 3350-067-025-200 |
| R138 | | N16-R050516-0818 | | 3350-103-000-5616 |
| R140 | | N16-R049598-0818 | | 3350-103-000-1571 |
| R142 | | N16-R051110-0813 | | 3350-098-000-6991 |
| R143 | | N16-R087849-8209 | | |
| R145,147 | | N16-R050577-0380 | | 3350-103-000-6141 |
| R148 | | N16-R066255-3781 | | 3350-501-000-5135 |
| R149 | | N16-R065923-9616 | | 3350-545-000-4955 |
| R150 | | N16-R049319-0818 | | 3350-103-000-1211 |
| S100,104 | | N17-S070777-8626 | | 3360-395-852-800 |
| S101 | | N17-S074139-4844 | | 3360-395-739-045 |
| S103 | | N17-S061164-7830 | | |
| T100 | | N17-T081561-4387 | | |
| T101,102,103 | | N17-T067634-4626 | | |
| T104 | | N17-T064538-1652 | | 3340-062-752-610 |
| T105 | | N17-T073863-5546 | | 3340-063-902-130 |
| V100,101,102 | | *N16-T075749-0000 | | 3370-286-000-6295 |
| V103 | | *N16-T075726-0000 | | 3370-259-000-6125 |
| V104 | | N16-T056719-0000 | | 3370-259-000-6158 |
| V105 | | *N16-T076005-0000 | | 3370-298-000-6155 |
| V106 | | N16-T056365-0000 | | 3370-316-000-6345 |
| V107 | | N16-T056175-0000 | | 3370-286-000-6165 |
| V108 | | N16-T055735-0000 | | 3370-304-000-5265 |
| V109 | | N16-T052001-0003 | | 3370-331-000-1615 |
| W100 | | N17-C048215-1505 | | 7700-087-196-52 |
| XF100 | | N17-F074266-9392 | | 8870-112-000-779 |
| XI100 | | *N17-L076854-4141 | | 548-615 |
| XV100,101, 102,103, 105,106, 107,109, | | N16-S062603-6702 | | 8850-882-880 |
| XV104 | | N16-S064063-6713 | | 8850-896-590 |
| XV108 | | N16-S063515-4151 | | 8850-889-946 |
| XY100 | | N16-S054287-5101 | | 8850-867-340 |
| Y100 | | G.F.M. | | |

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*Indicates: "For replacement use SNSN-"

TUNER, R.F. TN-274/FRR-502

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| C101 | N5910-508-0931 | | | |
| C102,109, 116,128, 132 | N5910-112-8248 | | | |
| C103,110, 117 | *N5910-270-9207 | | | |
| C104,105, 106,107, 108,112, 113,114, 115,119, 121,125, 126,127, 135,137, 139,144, 145,146 | *N5910-636-2339 | | | |
| C111,118 | *N5910-195-8752 | | | |
| C120 | *N5910-665-0201 | | | |
| C122 | *N5910-270-5390 | | | |
| C123 | *N5910-126-1611 | | | |
| C124 | *N5910-644-5957 | | | |
| C129,134 | N5910-112-8210 | | | |
| C130,140, 141 | *N5910-197-1562 | | | |
| C131 | *N5910-248-2217 | | | |
| C133 | *N5910-666-5811 | | | |
| C136 | *N5910-248-2230 | | | |
| C138 | N5910-643-7233 | | | |
| C142,143 | *N5910-644-3539 | | | |
| C147,148 | N5910-192-2162 | | | |
| I101 | *G6240-057-2887 | | | |
| L100 | N5950-563-3549 | | | |
| L101 | N5950-508-0103 | | | |
| P101 | N5935-259-7135 | | | |
| R101,110, 132 | *N5905-279-3519 | | | |
| R102,126, 127,128 | *N5905-279-2515 | | | |
| R103,107, 111,112, 116,120 | *N5905-195-6761 | | | |
| R104,113 | *N5905-279-3513 | | | |
| R105,114 | *N5905-190-8883 | | | |
| R106,115 | *N5905-192-0667 | | | |
| R108,117 | *N5905-195-6754 | | | |
| R109,118 | *N5905-190-8865 | | | |
| R121 | *N5905-279-1876 | | | |
| R122,133 | *N5905-171-2004 | | | |
| R123 | *N5905-299-2013 | | | |
| R124 | N5905-190-8883 | | | |
| R125 | N5905-279-3519 | | | |
| R129,130 | *N5909-254-9201 | | | |
| R131 | *N5905-279-1880 | | | |
| R134,136 | *N5905-279-3497 | | | |
| R135 | *N5905-252-5434 | | | |
| S101 | N5930-548-9990 | | | |

* Indicates: "For replacement use SNSN-"

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| S102 | N5930-508-0104 | | | |
| T100 | N5950-563-3550 | | | |
| T101,102 | N5950-563-7992 | | | |
| T103 | N5950-508-0099 | | | |
| V100,101, 103,104 | N5960-188-8566 | | | |
| V102 | *N5960-262-0152 | | | |
| XI101 | G6240-143-3084 | | | |
| XV100,101, 102,103, 104 | N5935-259-1944 | | | |
| XY101 | N5935-201-7119 | | | |
| Y101 | N5955-508-0294 | | | |
| Y102 | G.F.M. | | | |

* Indicates: "For replacement use SNSN-"

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| C201 | N5910-508-0931 | N16-C063647-8118 | | |
| C202,209, 216,228, 232 | | N16-C064133-6581 | | 3330-313420185 |
| C203,210, 217 | | *N16-C016784-9289 | | |
| C204,205, 206,207, 208,212, 215,219, 221,225, 226,227, 235,237, 239,244, 245,246 | | *N16-C019139-8871 | | 3330-055475243 |
| C211,218 | | N16-C016788-2530 | | |
| C220 | | *N16-C029080-6829 | | |
| C222 | | *N16-C030367-9395 | | |
| C223 | | N16-C063934-8129 | | 3330-313046248 |
| C224 | | *N16-C030531-4153 | | |
| C229,234 | | N16-C016541-7014 | | 3330-3134-30240 |
| C230,240, 241 | | N16-C015916-9005 | | 3330-055350095 |
| C231 | | *N16-C017392-9926 | | |
| C233 | | *N16-C017195-8091 | | |
| C236 | | N16-C017214-6130 | | 3330-055475239 |
| C238 | | N16-C059671-6046 | | 3330-058100089 |
| C242,243 | | *N16-C045773-8071 | | 3330-056200857 |
| C247,248 | | N16-C016276-2514 | | 3330-055350183 |
| I201 | *G6240-057-2887 | | | 8870-938000445 |
| L200 | N5950-508-0102 | N17-T082436-2757 | | |
| L201 | N5950-508-0103 | N16-C072148-2839 | | |
| P201 | | N17-C073297-4370 | | 8850-373600 |
| R201,210, 232 | | *N16-R049318-0438 | | 3350-1030001211 |
| R202,226, 227,228 | | *N16-R050821-0276 | | 3350-1030007416 |
| R203,207, 211,212, 216,220 | | *N16-R050632-0416 | | 3350-1030005866 |
| R204,213 | | *N16-R049660-0438 | | 3350-1030001921 |
| R205,214 | | *N16-R049237-0443 | | 3350-1030001151 |
| R206,209, 215,218 | | *N16-R050713-0380 | | 3350-0980005771 |
| R208,217 | | *N16-R050480-0131 | | |
| R221 | | *N16-R050011-0438 | | 3350-1030003516 |
| R222,233 | | *N16-R050371-0433 | | 3350-1030004941 |
| R223 | | *N16-R050479-0713 | | 3350-1330004256 |
| R224 | | N16-R049237-0443 | | |
| R225 | | N16-R049318-0438 | | |

* Indicates: "For replacement use SNSN-"

\# Indicates: Low Failure item - if required requisition from ESO referencing NavShips 900, 180A.

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| R229,230 | | *N16-R050479-0435 | | 3350-1030005461 |
| R231 | | *N16-R050038-0438 | | 3350-1030003631 |
| R234,236 | | *N16-R050443-0438 | | 3350-1020005351 |
| R235 | | *N16-R049597-0438 | | 3350-1030001571 |
| S201 | | N17-S061164-7830 | | 3360-073113692 |
| S202 | N5930-508-0104 | N17-S059441-7937 | | |
| T200 | N5950-508-0100 | N17-T082234-6219 | | |
| T201,202 | N5950-508-0101 | N17-T082436-6571 | | |
| T203 | N5950-508-0099 | N17-T082436-5463 | | |
| V200,201 203,204 | | N16-T056175-0000 | | 3370-2860006165 |
| V202 | | N16-T056203-0050 | | 3370-2860006285 |
| XI201 | | # | | 7700-525510 |
| XV200,201, 202,203, 204 | | *N17-S062603-6700 | | 8850-582880 |
| XY201 | | N16-S054287-5101 | | 8850-867340 |
| Y201 | N5955-508-0294 | N16-C096420-1298 | | |
| Y202 | | GFM | | |

* Indicates: "For replacement use SNSN-"
# Indicates: Low Failure item - if required requisition from ESO referencing NavShips 900, 180A.

TUNER, R.F. TN-276/FRR-502

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| C301 | N5910-508-0931 | | | |
| C302,309, 316,328, 332 | N5910-112-8248 | | | |
| C303,310, 317 | *N5910-270-9207 | | | |
| C304,305, 306,307, 308,312, 313,314, 315,319, 321,325, 326,327, 335,337, 344,345, 346 | *N5910-636-2339 | | | |
| C311,318 | *N5910-192-2162 | | | |
| C320 | *N5910-665-0201 | | | |
| C322 | *N5910-270-5390 | | | |
| C323 | N5910-126-1611 | | | |
| C324 | *N5910-644-5957 | | | |
| C329,334 | N5910-112-8210 | | | |
| C330 | N5910-666-8139 | | | |
| C331 | *N5910-184-2337 | | | |
| C333 | *N5910-191-9840 | | | |
| C336 | *N5910-248-2230 | | | |
| C338 | N5910-643-7233 | | | |
| C340,341 | *N5910-197-1562 | | | |
| C342,243 | *N5910-644-3539 | | | |
| C347,351 | *N5910-264-9443 | | | |
| C348,350 | N5910-636-2101 | | | |
| C349 | *N5910-174-5113 | | | |
| I301 | *G6240-057-2887 | | | |
| L300 | N5950-563-3545 | | | |
| L301 | N5950-508-0103 | | | |
| L302,303 | N5950-563-3546 | | | |
| P301 | N5935-259-7135 | | | |
| R301,310, 332 | *N5905-279-3519 | | | |
| R302,311, 326,327, 328 | *N5905-279-2515 | | | |
| R303,307, 309,312, 316,318, 319,320, 337,338 | *N5905-195-6761 | | | |
| R304,313 | *N5905-279-3513 | | | |
| R305,314 | *N5905-190-8883 | | | |
| R306,315 | *N5905-192-0667 | | | |
| R308,317 | *N5905-195-6754 | | | |
| R321 | *N5905-279-1876 | | | |
| R322,333 | *N5905-171-2004 | | | |

* Indicates: "For replacement use SNSN-".

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| R323 | *N5905-299-2013 | | | |
| R324 | N5905-190-8883 | | | |
| R325 | N5905-279-3519 | | | |
| R329,330 | *N5905-254-9201 | | | |
| R331 | *N5905-279-1880 | | | |
| R334,336 | *N5905-279-3497 | | | |
| R335 | *N5905-252-5434 | | | |
| S301 | N5930-548-9990 | | | |
| S302 | N5930-508-0104 | | | |
| T300 | N5950-563-3547 | | | |
| T301,302 | N5950-563-3548 | | | |
| T303 | N5950-508-0099 | | | |
| V300,301, 303,304 | N5960-188-8566 | | | |
| V302 | *N5960-262-0152 | | | |
| XI301 | G6240-143-3084 | | | |
| XV300,301, 302,303, 304 | N5935-259-1944 | | | |
| XY301 | N5935-201-7119 | | | |
| Y301 | N5955-508-0294 | | | |
| Y302 | G.F.M. | | | |

* Indicates: "For replacement use SNSN-".

TUNER, R.F. TN-277/FRR-502

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| C1,9, 16 | N5910-648-7993 | | | |
| C2,10, 17,27, 35 | N5910-112-8248 | | | |
| C3 | N5910-667-3879 | | | |
| C4,11 | *N5910-665-0252 | | | |
| C5,6 7,8, 12,13, 14,15, 18,19, 22,23, 24,25, 26,29, 37,38, 41,44 | *N5910-636-2339 | | | |
| C20,21 | *N5910-270-5390 | | | |
| C28 | *N5910-197-1569 | | | |
| C30,36 | N5910-112-8210 | | | |
| C31,33 | N5910-648-7994 | | | |
| C32 | N5910-191-5941 | | | |
| C34 | N5910-101-5590 | | | |
| C39,40 | *N5910-197-1562 | | | |
| C42 | N5910-248-2230 | | | |
| C43 | N5910-643-7233 | | | |
| I1 | *G6240-057-2887 | | | |
| L1 | N5950-699-5188 | | | |
| P1 | N5935-259-7135 | | | |
| R1,9, 17,27 | *N5905-279-3519 | | | |
| R2,10 21,22, 23 | *N5905-279-2515 | | | |
| R3,7, 11,15 | *N5905-195-6761 | | | |
| R4,12 | *N5905-279-3513 | | | |
| R5,13 | *N5905-190-8883 | | | |
| R6,14 | *N5905-192-0667 | | | |
| R8,16 | *N5905-279-1920 | | | |
| R18 | *N5905-279-1876 | | | |
| R19,28 | *N5905-171-2004 | | | |
| R20 | *N5905-299-2013 | | | |
| R24 | *N5905-279-1880 | | | |
| R25,26 | *N5905-254-9201 | | | |
| R29 | *N5905-252-5434 | | | |
| R30,31 | *N5905-279-3497 | | | |
| S1 | N5930-548-9990 | | | |
| T1 | N5950-696-0486 | | | |
| T2,3 | N5950-699-5198 | | | |
| T4 | N5950-645-2438 | | | |
| V1,2, 4,5 | N5960-188-8566 | | | |

*Indicates: "For replacement use FSN-"
# Indicates: "Low failure item. If required requisition from ESO referencing NAVSHIPS 900, 180A".

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| V3 | *N5960-262-0152 | | | |
| XI-1 | # | | | |
| XV1,2, 3,4, 5 | *N5935-259-1944 | | | |
| XY1 | N5935-201-7119 | | | |
| Y1 | G.F.M. | | | |

* Indicates: "For replacement use FSN-"
# Indicates: "Low failure item. If required requisition form ESO referencing NAVSHIPS 900, 108A".

TUNER, R.F. TN-5010/FRR-502

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| C500,503,504, 507,508,510, 511,512,514, 515,516,519, 520,521,522, 526,529,530, 534,538 | | *N16-C019139-8871 | | 3330-055-475-243 |
| C501 | | N16-C063470-1461 | | 3330-058-100-088 |
| C502,509,513 | | N16-C063934-8129 | | 3330-313-046-248 |
| C505,537 | | N16-C017218-8281 | | 3330-055-475-266 |
| C517,518 | | *N16-C030367-9395 | | 3330-055-950-292 |
| C523 | | N16-C064133-6581 | | 3330-313-420-185 |
| C524,528 | | N16-C016541-7014 | | 3330-313-430-240 |
| C525 | | N16-C017976-2501 | | 3330-313-889-919 |
| C527 | | N16-C064062-6985 | | 3330-313-334-199 |
| C531 | | N16-C017214-6130 | | 3330-055-475-239 |
| C532 | | N16-C059671-6046 | | 3330-058-100-0089 |
| C533 | | N16-C015916-9005 | | 3330-055-350-095 |
| C535 | | *N16-C015369-4394 | | 3330-055-350-188 |
| C536 | | N16-C031080-2219 | | 3330-376-120-840 |
| I500 | | *G17-L006305-0000 | | |
| L501 | | N16-S089794-3406 | | |
| L502 | | N17-T076495-5950 | | |
| P500 | | N17-C073297-4370 | | |
| R500,505,507, 512 | | N16-R050633-0785 | | |
| R501,503,508, 510,514 A,B | | N16-R049238-0818 | | |
| R502,509 | | N16-R049661-0818 | | 3350-103-000-1921 |
| R504,511 | | N16-R050714-0818 | | 3300-381-171-514 |
| R506,513 | | N16-R050400-0511 | | 3350-165-000-596 |
| R515 | | N16-R049877-0818 | | 3350-103-000-2646 |
| R516 | | N16-R050481-0233 | | 3350-133-000-4256 |
| R517,518,519 | | N16-R050822-0761 | | 3350-103-000-7416 |
| R520 | | N16-R050129-0815 | | 3350-103-000-3981 |
| R521 | | N16-R050479-0440 | | 3350-103-000-5461 |
| R523 | | N16-R049319-0818 | | 3350-103-000-1211 |
| R524 | | N16-R050372-0833 | | 3350-103-000-4941 |
| R525 | | N16-R049598-0818 | | 3350-103-000-1571 |
| R526,527 | | N16-R050444-0233 | | |
| S500 | | N17-S061164-7830 | | |
| T500 | | N17-T081980-3117 | | |
| T501 | | N17-T081609-4202 | | |
| T502 | | N17-T081464-2652 | | |
| T503 | | N17-T067634-4626 | | |
| V500,501, 503,504 | | N16-T056175-0000 | | 3370-286-000-6165 |
| V502 | | N16-T056203-0050 | | 3370-286-000-6285 |
| XI500 | | # | | 7700-525-510 |
| XV500,501, 502,503, 504 | | N16-S062603-6702 | | 8850-882-880 |
| XY500 | | N16-S054287-5101 | | 8850-867-340 |
| Y500 | | G.F.M. | | 2100-2X911-3500 |

#Indicates: Low failure item - if required requisition from ESO referencing NAVSHIPS 900,180A.
*Indicates: "For replacement use SNSN-"

TUNER, R.F. TN-5011/FRR-502

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| C600,603,604, 607,608,610, 611,612,614, 615,616,619, 620,621,622, 626,629,630, 634,638 | | *N16-C019139-8871 | | 3330-055-475-243 |
| C601 | | N16-C063470-1461 | | 3330-058-100-088 |
| C602,609,613 | | N16-C063934-8129 | | 3330-313-046-248 |
| C605,637 | | N16-C017406-7214 | | 3330-055-475-238 |
| C617,618 | | *N16-C030367-9395 | | 3330-055-950-292 |
| C623 | | N16-C064133-6581 | | 3330-313-420-185 |
| C624,628 | | N16-C016541-7014 | | 3330-313-430-240 |
| C625 | | N16-C017699-7215 | | |
| C627 | | N16-C064062-6985 | | 3330-313-334-199 |
| C631 | | N16-C017214-6130 | | 3330-055-475-239 |
| C632 | | N16-C059671-6046 | | 3330-058-100-0089 |
| C633 | | N16-C015916-9005 | | 3330-055-350-095 |
| C635 | | N16-C015401-4505 | | 3330-055-350-318 |
| C636 | | N16-C031502-2619 | | 3330-376-125-230 |
| I600 | | *G17-L006305-0000 | | |
| L601 | | N16-S089794-2711 | | |
| L602 | | N17-T082612-8849 | | |
| P600 | | N17-C073297-4370 | | 8850-373-600 |
| R600,605,607, 612 | | N16-R050633-0785 | | |
| R601,603,608, 610,614 A,B | | N16-R049238-0818 | | |
| R602,609 | | N16-R049661-0818 | | 3350-103-000-1921 |
| R604,611 | | N16-R050714-0818 | | 3300-381-171-514 |
| R606,613 | | N16-R050400-0511 | | 3350-165-000-596 |
| R615 | | N16-R049877-0818 | | 3350-103-000-2646 |
| R616 | | N16-R050481-0233 | | 3350-133-000-4256 |
| R617,618,619 | | N16-R050822-0761 | | 3350-103-000-7416 |
| R620 | | N16-R050093-0816 | | |
| R621 | | N16-R050479-0440 | | 3350-103-000-5461 |
| R623 | | N16-R049319-0818 | | 3350-103-000-1211 |
| R624 | | N16-R050372-0833 | | 3350-103-000-4941 |
| R625 | | N16-R049598-0818 | | 3350-103-000-1571 |
| R626,627 | | N16-R050444-0233 | | |
| S600 | | N17-S061164-7830 | | |
| T600 | | N17-T082796-4184 | | |
| T601 | | N17-T081954-4101 | | |
| T602 | | N16-T081928-2255 | | |
| T603 | | N17-T067634-4626 | | |
| V600,601, 603,604 | | N16-T056175-0000 | | 3370-286-000-6165 |
| V602 | | N16-T056203-0050 | | 3370-286-000-6285 |
| XI600 | | # | | 7700-525-510 |
| XV600,601, 602,603, 604 | | N16-S062603-6702 | | 8850-882-880 |
| XY600 | | N16-S054287-5101 | | 8850-867-340 |
| Y600 | | G.F.M. | | |

#Indicates: Low failure item - if required requisition from ESO referencing NAVSHIPS 900,180A.
*Indicates: "For replacement use SNSN-"

TUNER, R.F. TN-5012/FRR-502

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| C700,703,704, 707,708,710, 711,712,714, 715,716,719, 720,721,722, 726,730,734, 738 | | *N16-C019139-8871 | | 3330-055-475-243 |
| C701 | | N16-C063470-1461 | | 3330-058-100-088 |
| C702,709,713, 727 | | N16-C064062-6985 | | 3330-313-334-199 |
| C705,737 | | N16-C016157-6400 | | |
| C717,718 | | *N16-C030367-9395 | | 3330-055-950-292 |
| C723 | | N16-C063934-8129 | | 3330-313-046-248 |
| C724,728 | | N16-C016541-7014 | | 3330-313-430-240 |
| C725 | | N16-C016799-4750 | | 3330-055-475-355 |
| C731 | | N16-C017214-6130 | | 3330-055-475-239 |
| C732 | | N16-C059671-6046 | | 3330-058-100-0089 |
| C733 | | N16-C015916-9005 | | 3330-055-350-095 |
| C735 | | N16-C015369-4505 | | 3330-055-350-150 |
| C736 | | N16-C031897-8619 | | 3330-055-950-038 |
| I700 | | *G17-L006305-0000 | | |
| L701 | | N16-S089794-3406 | | |
| L702 | | N17-T081896-3238 | | |
| P700 | | N17-C073297-4370 | | 8850-373-600 |
| R700,705,707, 712 | | N16-R050633-0785 | | |
| R701,703,708, 710 | | N16-R049238-0818 | | |
| R702,709 | | N16-R049661-0818 | | 3350-103-000-1921 |
| R704,711 | | N16-R050714-0818 | | 3300-381-171-514 |
| R706,713 | | N16-R050400-0511 | | 3350-165-000-596 |
| R715 | | N16-R049877-0818 | | 3350-103-000-2646 |
| R716 | | N16-R050481-0233 | | 3350-133-000-4256 |
| R717,718,719 | | N16-R050822-0761 | | 3350-103-000-7416 |
| R720 | | N16-R050065-0438 | | |
| R721 | | N16-R050479-0440 | | 3350-103-000-5461 |
| R723 | | N16-R049319-0818 | | 3350-103-000-1211 |
| R724 | | N16-R050372-0833 | | |
| R725 | | N16-R049598-0818 | | 3350-103-000-1571 |
| R726,727 | | N16-R050444-0233 | | |
| R728 | | N16-R049606-0438 | | 3350-098-000-2391 |
| S700 | | N17-S061164-7830 | | |
| T700 | | N17-T081781-9991 | | |
| T701 | | N17-T082361-8949 | | |
| T702 | | N17-T067988-9086 | | |
| T703 | | N17-T067634-4626 | | |
| V700,701,703, 704 | | N16-T056175-0000 | | 3370-286-000-6165 |
| V702 | | N16-T056203-0050 | | 3370-286-000-6285 |
| XI700 | | # | | 7700-525-510 |
| XV700,701, 702,703, 704 | | N16-S062603-6702 | | 8850-882-880 |

#Indicates: Low Failure item - if required requisition from ESO referencing NAVSHIPS 900,180A.
*Indicates: "For replacement use SNSN-"

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| XY700<br>Y700 | | N16-S054287-5101<br>G.F.M. | | 8850-867-340<br>2100-2X911-3500 |

#Indicates: Low failure item - if required requisition from ESO referencing NAVSHIPS 900,180A.
*Indicates: "For replacement use SNSN-"

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| XV800,801, 802,803, 804 | | N16-S062603-6702 | | 8850-882-880 |
| XY800 | | N16-S054287-5101 | | 8850-867-340 |
| Y800 | | G.F.M. | | 2100-2X911-3500 |

CABINET, ELECTRICAL EQUIPMENT CY-5045A/FRR-502

| | | | | |
|---|---|---|---|---|
| F1 | | G17-F016302-0080 | | |
| J1 | | N17-C073428-3259 | | 8850-491-260 |
| J2,3 | | N17-C073583-3424 | | 8850-753-180 |
| S1 | | N17-S073082-9028 | | 3360-395-853-000 |
| T1 | | N17-T070669-1049 | | |
| W1 | | N17-C048215-1505 | | 7700-087-196-52 |
| XF1 | | N17-F074266-9392 | | 8870-112-000-779 |

TUNER, R.F. TN-5014/FRR-502

| REF. DESIG. | STOCK NUMBERS | | | |
|---|---|---|---|---|
| | FEDERAL | STANDARD NAVY | SIGNAL CORPS | USAF |
| C800,803,804, 807,808,810, 811,812,814, 815,816,819, 820,821,822, 826,829,830, 834,838 | | *N16-C019139-8871 | | 3330-055-475-243 |
| C801 | | N16-C063470-1461 | | 3330-058-100-088 |
| C802,809,813 | | N16-C064062-6985 | | 3330-313-334-199 |
| C805 | | *N16-C015749-2063 | | 3330-055-350-230 |
| C806 | | N16-C015514-3301 | | |
| C817,818 | | *N16-C030367-9395 | | 3330-055-950-292 |
| C823 | | N16-C063934-8129 | | |
| C824,825,828 | | N16-C016541-7014 | | 3330-312-430-240 |
| C827 | | N16-C063900-6761 | | 3330-312-922-272 |
| C831 | | N16-C017214-6130 | | 3330-055-475-239 |
| C832 | | N16-C059671-6046 | | 3330-058-100-0089 |
| C833 | | N16-C015916-9005 | | 3330-055-350-095 |
| C835 | | N16-C015401-4505 | | 3330-055-350-318 |
| C836 | | *N16-C031343-9216 | | 3338-055-950-259 |
| I800 | | *G17-L006305-0000 | | |
| L800 | | N16-S089739-6815 | | |
| L801 | | N16-S089793-9196 | | |
| P800 | | N17-C073297-4370 | | 8850-373-600 |
| R800,805, 807,812 | | N16-R050633-0785 | | |
| R801,803,808, 810,814 A,B | | N16-R049238-0818 | | |
| R802,809 | | N16-R049661-0818 | | 3350-103-000-1921 |
| R804,811 | | N16-R050714-0818 | | 3300-381-171-514 |
| R806,813 | | N16-R050400-0511 | | 3350-165-000-596 |
| R815 | | N16-R049877-0818 | | 3350-103-000-2646 |
| R816 | | N16-R050481-0233 | | 3350-133-000-4256 |
| R817,818,819 | | N16-R050822-0761 | | 3350-103-000-7416 |
| R820 | | N16-R049967-0760 | | |
| R821 | | N16-R050479-0440 | | 3350-103-000-5461 |
| R823 | | N16-R049319-0818 | | 3350-103-000-1211 |
| R824,826 | | N16-R050371-0433 | | 3350-103-000-4941 |
| R825,827 | | N16-R049597-0438 | | 3350-098-000-2351 |
| R828 | | N16-R049606-0438 | | 3350-098-000-2391 |
| S800 | | N17-S061164-7830 | | |
| T800 | | N17-T082143-8005 | | |
| T801 | | N17-T081979-5014 | | |
| T802 | | N17-T082049-5270 | | |
| T803 | | N17-T067634-4626 | | |
| T804 | | N17-T082128-4346 | | |
| V800,801,804 | | *N16-T075654-0000 | | 3370-286-000-6215 |
| V802 | | N16-T056203-0050 | | 3370-286-000-6285 |
| V802 | | N16-T056175-0000 | | 3370-286-000-6165 |
| XI800 | | # | | 7700-525-510 |

#Indicates: Low failure item - if required requisition from ESO referencing NAVSHIPS 900,180A.
*Indicates: "For replacement use SNSN-"

# STOCK NUMBER CROSS REFERENCE

## TUNER, R.F. TN-274/FRR-502

| FEDERAL | REF. DESIG. |
|---|---|
| *G6240-057-2887 | I101 |
| G6240-143-3084 | XI101 |
| *N5905-171-2004 | R122,133 |
| *N5905-190-8865 | R109,118 |
| *N5905-190-8883 | R105,114 |
| N5905-190-8883 | R124 |
| *N5905-192-0667 | R106,115 |
| *N5905-195-6754 | R108,117 |
| *N5905-195-6761 | R103,107, 111,112, 116,120 |
| *N5905-252-5435 | R135 |
| *N5905-254-9201 | R129,130 |
| *N5905-279-1876 | R121 |
| *N5905-279-1880 | R131 |
| *N5905-279-2515 | R102,126, 127,128 |
| *N5905-279-3497 | R134,136 |
| *N5905-279-3513 | R104,113 |
| *N5905-279-3519 | R101,110, 132 |
| N5905-279-3519 | R125 |
| *N5905-299-2013 | R123 |
| N5910-112-8210 | C129,134 |
| N5910-112-8248 | C102,109, 116,128, 132 |
| *N5910-126-1611 | C123 |
| N5910-192-2162 | C147,148 |
| *N5910-195-8752 | C111,118 |
| *N5910-197-1562 | C130,140, 141 |
| *N5910-248-2217 | C131 |
| *N5910-248-2230 | C136 |
| *N5910-270-5390 | C122 |
| *N5910-270-9207 | C103,110, 117 |
| N5910-508-0931 | C101 |
| *N5910-636-2339 | C104,105, 106,107, 108,112, 113,114, 115,119, 121,125, 126,127, 135,137, 139,144, 145,146 |
| N5910-643-7233 | C138 |
| *N5910-644-3539 | C142,143 |
| *N5910-644-5957 | C124 |
| *N5910-665-0201 | C120 |
| *N5910-666-5811 | C133 |
| N5930-508-0104 | S102 |
| N5930-548-9990 | S101 |
| N5935-201-0294 | XY101 |
| N5935-259-1944 | XV100,101, 102,103, 104 |
| N5935-259-7135 | P101 |
| N5950-508-0099 | T103 |
| N5950-508-0103 | L101 |
| N5950-563-3549 | L100 |
| N5950-563-3550 | T100 |
| N5950-563-7992 | T101,102 |
| N5955-508-0294 | Y101 |
| N5960-188-8566 | V100,101, 103,104 |
| *N5960-262-0152 | V102 |
| G.F.M. | Y102 |

## TUNER, R.F. TN-276/FRR-502

| FEDERAL | REF. DESIG. |
|---|---|
| *G6240-057-2887 | I301 |
| G6240-143-3084 | XI301 |
| *N5905-171-2004 | R322,333 |
| *N5905-190-8883 | R305,314 |
| N5905-190-8883 | R324 |
| *N5905-192-0667 | R306,315 |
| *N5905-195-6754 | R308,317 |
| *N5905-195-6761 | R303,307, 309,316, 318,319, 320,337, 338 |
| *N5905-252-5434 | R335 |
| *N5905-254-9201 | R329,330 |
| *N5905-279-1876 | R321 |
| *N5905-279-1880 | R331 |
| *N5905-279-2515 | R302,311, 326,327, 328 |
| *N5905-279-3497 | R334,336 |
| *N5905-279-3513 | R304,303 |
| *N5905-279-3519 | R301,310, 332 |
| N5905-279-3519 | R325 |
| *N5905-299-2013 | R323 |
| N5910-112-8210 | C329,334 |
| N5910-112-8248 | C302,309, 316,328, 332 |
| N5910-126-1611 | C323 |
| *N5910-174-5113 | C349 |
| *N5910-184-2337 | C331 |
| *N5910-191-9840 | C333 |
| *N5910-192-2162 | C311,318 |
| *N5910-197-1562 | C340,341 |
| *N5910-248-2230 | C336 |
| *N5910-264-9443 | C347,351 |
| *N5910-270-5390 | C322 |
| *N5910-270-9207 | C303,310, 307 |
| N5910-508-0931 | C301 |
| N5910-636-2101 | C348,350 |
| *N5910-636-2339 | C304,305, 306,307, 308,312, 313,314, 315,319, 321,325, 326,327, 335,337, 344,345, 346 |
| N5910-643-7233 | C338 |
| *N5910-644-3539 | C342,343 |
| *N5910-644-5957 | C324 |
| *N5910-665-0201 | C320 |
| N5910-666-8139 | C330 |
| N5930-508-0104 | S302 |
| N5930-548-9990 | S301 |
| N5935-201-7119 | XY301 |
| N5935-259-1944 | XV300, 301,302, 303,304 |
| N5935-259-7135 | P301 |
| N5950-508-0099 | T303 |
| N5950-508-0103 | L301 |
| N5950-563-3545 | L300 |
| N5950-563-3546 | L302,303 |
| N5950-563-3547 | T300 |
| N5950-563-3548 | T301,302 |
| N5955-508-0294 | Y301 |
| N5960-188-8566 | V300,301, 303,304 |
| *N5960-262-0152 | V302 |
| G.F.M. | Y302 |

## TUNER, R.F. TN-277/FRR-502

| FEDERAL | REF. DESIG. |
|---|---|
| *G6240-057-2887 | I1 |
| *N5905-171-2004 | R19,28 |
| *N5905-190-8883 | R5,13 |

* Indicates: "For replacement use SNSN-"

R-5007/FRR-502 FFR-2

| FEDERAL | REF. DESIG. |
|---|---|
| *N5905-192-0667 | R6,14 |
| *N5905-195-6761 | R3,7, 11,15 |
| *N5905-252-5434 | R29 |
| *N5905-254-9201 | R25,26 |
| *N5905-279-1876 | R18 |
| *N5905-279-1880 | R24 |
| *N5905-279-1920 | R8,16 |
| *N5905-279-2515 | R2,10, 21,22, 23 |
| *N5905-279-3497 | R30,31 |
| *N5905-279-3513 | R4,12 |
| *N5905-279-3519 | R1,9, 17,27 |
| *N5905-299-2013 | R20 |
| N5910-101-5590 | C34 |
| N5910-112-8210 | C30,36 |
| N4910-112-8248 | C2,10, 17,27, 35 |
| N5910-191-5941 | C32 |
| *N5910-197-1562 | C39,40 |
| *N5910-197-1569 | C28 |
| N5910-248-2230 | C42 |
| *N5910-270-5390 | C20,21 |
| *N5910-636-2339 | C5,6, 7,8, 12,13, 14,15, 18,19, 22,23, 24,25, 26,29, 37,38, 41,44 |
| N5910-643-7233 | C43 |
| N5910-648-7993 | C1,9, 16 |
| N5910-648-7994 | C31,33 |
| *N5910-665-0252 | C4,11 |
| N5910-667-3879 | C3 |
| N5930-548-9990 | S1 |
| N5935-201-7119 | XY1 |
| *N5935-259-1944 | XV1,2, 3,4, 5 |
| N5935-259-7135 | P1 |
| N5950-645-2438 | T4 |
| N5950-696-0486 | T1 |
| N5950-699-5188 | L1 |
| N5950-699-5198 | T2,3 |
| N5960-188-8566 | V1,2, 4,5 |
| *N5960-262-0152 | V3 |
| # | XI-1 |
| G.F.M. | Y1 |

| STANDARD NAVY | REF. DESIG. |
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| G17-F016302-0100 | F100 |
| *G17-L006305-0000 | I100 |
| N16-C015628-9005 | C145 |
| N16-C015916-9005 | C144 |
| *N16-C015980-8561 | C109 |
| *N16-C016140-8561 | C131 |
| N16-C016276-2514 | C141 |
| N16-C016541-7014 | C138 |
| N16-C016596-2514 | C119 |
| N16-C017085-7060 | C118,121 |
| N16-C017218-8281 | C134 |
| N16-C017406-7214 | C135,142 |
| *N16-C018659-7522 | C132 |
| N16-C019010-8091 | C127,133 |
| *N16-C019139-8871 | C101,102, 103,106, 107,108, 110,113, 114,115, 122,125, 139,140, 143,146, 154 |
| N16-C019238-9510 | C153,157, 158 |
| N16-C019788-8858 | C151 |
| N16-C030114-4271 | C155,156 |
| N16-C030183-3521 | C136 |
| *N16-C030367-9395 | C104,105, 111,112, 116,117 |
| *N16-C048817-2795 | C128 |
| *N16-C049958-5179 | C148, 149,150 |
| N16-C053192-8190 | C147 |
| N16-C053683-4665 | C120 |
| *N16-C055872-1577 | C123,129, 130,152 |
| N16-C058469-5910 | C137 |
| N16-C064062-6985 | C100 |
| N16-C071597-2121 | L102,104 |
| N16-R029318-5633 | L100,101 |
| N16-R049319-0818 | R150 |
| N16-R049598-0818 | R140 |
| N16-R049643-0818 | R134 |
| N16-R049661-0818 | R101, 106,110 |
| N16-R049786-0701 | R126 |
| N16-R049921-0349 | R135 |
| N16-R049968-0525 | R127 |
| N16-R050012-0816 | R104,109, 113,122 |
| N16-R050092-0438 | R128 |

| STANDARD NAVY | REF. DESIG. |
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| N16-R050200-0438 | R114,144, 146 |
| N16-R050416-0435 | R105,137 |
| N16-R050479-0440 | R119,139 |
| N16-R050516-0818 | R138 |
| N16-R050552-0818 | R103,108, 112 |
| N16-R050587-0435 | R133 |
| N16-R050633-0785 | R102,107, 111 |
| N16-R050651-0818 | R123,124, 132,141 |
| N16-R050677-0380 | R145,147 |
| N16-R050740-0380 | R115 |
| N16-R050741-0818 | R100 |
| N16-R050822-0761 | R118,120, 125,129, 130,131 |
| N16-R050993-0818 | R116,117 |
| N16-R051110-0813 | R142 |
| N16-R065923-9616 | R149 |
| N16-R066255-3781 | R148 |
| N16-R087419-4625 | R136 |
| N16-R087849-4759 | R143 |
| N16-R088342-5572 | R121 |
| N16-S054287-5101 | XY100 |
| N16-S062603-6702 | XV100, 101,102, 103,105, 106,107, 109 |
| N16-S063515-4151 | XV108 |
| N16-S064063-6713 | XV104 |
| N16-T052001-0003 | V109 |
| N16-T055735-0000 | V108 |
| N16-T056175-0000 | V107 |
| N16-T056365-0000 | V106 |
| N16-T056719-0000 | V104 |
| *N16-T075726-0000 | V103 |
| *N16-T075749-0000 | V100,101, 102 |
| *N16-T076005-0000 | V105 |
| *N17-B077585-4501 | E100 |
| N17-B077840-1659 | E101,102 |
| N17-C048215-1505 | W100 |
| N17-C073108-5890 | J109 |
| N17-C073108-7477 | J100,101, 102,103, 104 |
| N17-C073185-1208 | J105 |
| *N17-C073428-3259 | J108 |
| N17-C073583-3424 | J107 |
| N17-F074266-9392 | XF100 |
| N17-J039248-4418 | J106 |
| *N17-L076854-4141 | XI100 |
| N17-S061164-7830 | S103 |

| STANDARD NAVY | REF. DESIG. |
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| N17-S070777-8626 | S100,104 |
| N17-S074139-4844 | S101 |
| N17-T064538-1652 | T104 |
| N17-T067634-4626 | T101,102, 103 |
| N17-T073847-5951 | L103 |
| N17-T073863-5546 | T105 |
| N17-T081561-4387 | T100 |
| GFM | Y100 |

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| N16-C015916-9005 | C230, 240, 241 |
| N16-C016276-2514 | C247, 248 |
| N16-C016541-7014 | C229, 234 |
| *N16-C016784-9289 | C203, 210, 217 |
| N16-C016788-2530 | C211, 218 |
| *N16-C017195-8091 | C233 |
| N16-C017214-6130 | C236 |
| *N16-C017392-9926 | C231 |
| *N16-C019139-8871 | C204, 205, 206, 207, 208, 212, 213, 214, 215, 219, 221, 225, 226, 227, 235, 237, 239, 244, 245, 246 |
| *N16-C029080-6829 | C220 |
| *N16-C030367-9395 | C222 |
| *N16-C030531-4153 | C224 |
| *N16-C045773-8071 | C242, 243 |
| N16-C059671-6046 | C238 |
| N16-C063647-8118 | C201 |
| N16-C063934-8129 | C223 |
| N16-C064133-6581 | C202, 209, 216, 228, 232 |
| N16-C072148-2839 | L201 |
| N16-C096420-1298 | Y201 |
| N16-R049237-0443 | R224 |
| *N16-R049237-0443 | R205, 214 |
| N16-R049318-0438 | R225 |
| *N16-R049318-0438 | R201, 210, 232 |
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| *N16-R049660-0438 | R204, 213 |
| *N16-R050011-0438 | R221 |
| *N16-R050038-0438 | R231 |
| *N16-R050371-0433 | R222, 233 |
| *N16-R050443-0438 | R234, 236 |

| STANDARD NAVY | REF. DESIG. |
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| *N16-R050479-0435 | R229, 230 |
| *N16-R050479-0713 | R223 |
| *N16-R050480-0131 | R208, 217 |
| *N16-R050632-0416 | R203, 207, 211, 212, 216, 220 |
| *N16-R050713-0380 | R206, 209, 215, 218 |
| *N16-R050821-0276 | R202, 226, 227, 228 |
| N16-S054287-5101 | XY201 |
| N16-T056175-0000 | V200, 201, 203, 204 |
| N16-T056203-0050 | V202 |
| N17-C073297-4370 | P201 |
| N17-S059441-7937 | S202 |
| N17-S061164-7830 | S201 |
| *N17-S062603-6700 | XV200, 201, 202, 203, 204 |
| N17-T082234-6219 | T200 |
| N17-T082436-2757 | L200 |
| N17-T082436-5463 | T203 |
| N17-T082436-6571 | T201, 202 |
| # | XI201 |
| GFM | Y202 |

| TN-5010/FRR-502 | FFRD-5 |
|---|---|
| *G17-L006305-0000 | I500 |
| *N16-C015369-4394 | C535 |
| N16-C015916-9005 | C533 |
| N16-C016541-7014 | C524,528 |
| N16-C017976-2501 | C525 |
| N16-C017214-6130 | C531 |
| N16-C017218-8281 | C505,537 |
| *N16-C019139-8871 | C500,503, 504,507, 508,510, 511,512, 514,515, 516,519, 520,521, 522,526, 529,530, 534,538 |
| *N16-C030367-9395 | C517,518 |
| N16-C031080-2219 | C536 |
| N16-C059671-6046 | C532 |
| N16-C063470-1461 | C501 |
| N16-C063934-8129 | C502,509, 513 |
| N16-C064062-6985 | C527 |
| N16-C064133-6581 | C523 |

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|---|---|
| N16-R049238-0818 | R501,503, 508,510, 514A,B |
| N16-R049319-0818 | R523 |
| N16-R049598-0818 | R525 |
| N16-R049661-0818 | R502,509 |
| N16-R049877-0818 | R515 |
| N16-R050129-0815 | R520 |
| N16-R050372-0833 | R524 |
| N16-R050400-0511 | R506,513 |
| N16-R050444-0233 | R526,527 |
| N16-R050479-0440 | R521 |
| N16-R050481-0233 | R516 |
| N16-R050633-0785 | R500,505, 507,512 |
| N16-R050714-0818 | R504,511 |
| N16-R050822-0761 | R517,518, 519 |
| N16-S054287-5101 | XY500 |
| N16-S062603-6702 | XV500, 501,502, 503,504 |
| N16-S089794-3406 | L501 |
| N16-T056175-0000 | V500,501, 503,504 |
| N16-T056203-0050 | V502 |
| N17-C073297-4370 | P500 |
| N17-S061164-7830 | S500 |
| N17-T067634-4626 | T503 |
| N17-T076495-5950 | L502 |
| N17-T081464-2652 | T502 |
| N17-T081609-4202 | T501 |
| N17-T081980-3117 | T500 |
| # | XI500 |
| GFM | Y500 |

| TN-5011/FRR-502 | FFRD-6 |
|---|---|
| *G17-L006305-0000 | I600 |
| N16-C015401-4505 | C635 |
| N16-C015916-9005 | C633 |
| N16-C016541-7014 | C624,628 |
| N16-C017214-6130 | C631 |
| N16-C017406-7214 | C605,637 |
| N16-C017699-7215 | C625 |
| *N16-C019139-8871 | C600,603, 604,607, 608,610, 611,612, 614,615, 616,619, 620,621, 622,626, 629,630, 634,638 |
| *N16-C030367-9395 | C617,618 |

#Indicates: Low failure item - if required requisition from ESO referencing NAVSHIPS 900,180A.
*Indicates: "For replacement use SNSN-"

| STANDARD NAVY | REF. DESIG. |
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| N16-C031502-2619 | C636 |
| N16-C059671-6046 | C632 |
| N16-C063470-1461 | C601 |
| N16-C063934-8129 | C602,609 613 |
| N16-C065062-6985 | C627 |
| N16-C064133-6581 | C623 |
| N16-R049238-0818 | R601,603, 608,610, 614A,B |
| N16-R049319-0818 | R623 |
| N16-R049598-0818 | R625 |
| N16-R049661-0818 | R602,609 |
| N16-R049877-0818 | R615 |
| N16-R050093-0816 | R620 |
| N16-R050372-0833 | R624 |
| N16-R050400-0511 | R606,613 |
| N16-R050444-0233 | R626,627 |
| N16-R050479-0440 | R621 |
| N16-R050481-0233 | R616 |
| N16-R050633-0785 | R600,605, 607,612 |
| N16-R050714-0818 | R604,611 |
| N16-R050822-0761 | R617,618, 619 |
| N16-S054287-5101 | XY600 |
| N16-S062603-6702 | XV600, 601,602, 603,604 |
| N16-S089794-2711 | L601 |
| N16-T056175-0000 | V600,601, 603,604 |
| N16-T056203-0050 | V602 |
| N16-T081928-2255 | T602 |
| N17-C073297-4370 | P600 |
| N17-S061164-7830 | S600 |
| N17-T067634-4626 | T603 |
| N17-T081954-4101 | T601 |
| N17-T082612-8849 | L602 |
| N17-T082796-4184 | T600 |
| # | XI600 |
| GFM | Y600 |

| TN-5012/FFR-502 | FFRD-7 |
|---|---|
| *G17-L006305-0000 | I700 |
| N16-C015369-4505 | C735 |
| N16-C015916-9005 | C733 |
| N16-C016157-6400 | C705,737 |
| N16-C016541-7014 | C724,728 |
| N16-C016799-4750 | C725 |
| N16-C017214-6130 | C731 |
| *N16-C019139-8871 | C700,703, 704,707, 708,710, |

| STANDARD NAVY | REF. DESIG. |
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| *N16-C019139-8871 | 711,712, 714,715, 716,719, 720,721, 722,726, 729,730, 734,738 |
| *N16-C030367-9395 | C717,718 |
| N16-C031897-8619 | C736 |
| N16-C059671-6046 | C732 |
| N16-C063470-1461 | C701 |
| N16-C063934-8129 | C723 |
| N16-C064062-6985 | C702,709, 713,727 |
| N16-R049238-0818 | R701,703, 708,710 |
| N16-R049319-0818 | R723 |
| N16-R049598-0818 | R725 |
| N16-R049606-0438 | R728 |
| N16-R049661-0818 | R702,709 |
| N16-R049877-0818 | R715 |
| N16-R050065-0438 | R720 |
| N16-R050372-0833 | R724 |
| N16-R050400-0511 | R706,713 |
| N16-R050444-0233 | R726,727 |
| N16-R050479-0440 | R721 |
| N16-R050481-0233 | R716 |
| N16-R050633-0785 | R700,705, 707,712 |
| N16-R050714-0818 | R704,711 |
| N16-R050822-0761 | R717,718, 719 |
| N16-S054287-5101 | XY700 |
| N16-S062603-6702 | XV700, 701,702, 703,704 |
| N16-S089794-3406 | L701 |
| N16-T056175-0000 | V700,701, 703,704 |
| N16-T056203-0050 | V702 |
| N17-C073297-4370 | P700 |
| N17-S061164-7830 | S700 |
| N17-T067634-4626 | T703 |
| N17-T067988-9086 | T702 |
| N17-T081781-9991 | T700 |
| N17-T081896-3238 | L702 |
| N17-T082361-8949 | T701 |
| # | XI700 |
| GFM | Y700 |

| TN-5014/FRR-502 | FFRD-8 |
|---|---|
| *G17-L006305-0000 | I800 |
| N16-C015401-4505 | C835 |
| N16-C015514-3301 | C806 |

| STANDARD NAVY | REF. DESIG. |
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| N16-C015916-9005 | C833 |
| *N16-C015949-2063 | C805 |
| N16-C016541-7014 | C824,825, 828 |
| N16-C017214-6130 | C831 |
| *N16-C019139-8871 | C800,803, 804,807, 808,810, 811,812, 814,815, 816,819, 820,821, 822,826, 829,830, 834,838 |
| *N16-C030367-9395 | C817,818 |
| *N16-C031343-9216 | C836 |
| N16-C059671-6064 | C832 |
| N16-C063470-1461 | C801 |
| N16-C063900-6761 | C827 |
| N16-C063934-8129 | C823 |
| N16-C064062-6985 | C802,809, 813 |
| N16-R049238-0818 | R801,803, 808,810, 814A,B |
| N16-R049319-0818 | R823 |
| N16-R049597-0438 | R825,827 |
| N16-R049606-0438 | R828 |
| N16-R049661-0818 | R802,809 |
| N16-R049877-0818 | R815 |
| N16-R049967-0760 | R820 |
| N16-R050371-0433 | R824,826 |
| N16-R050400-0511 | R806,813 |
| N16-R050479-0440 | R821 |
| N16-R050481-0233 | R816 |
| N16-R050633-0785 | R800,805, 807,812 |
| N16-R050714-0818 | R804,811 |
| N16-R050822-0761 | R817,818, 819 |
| N16-S054287-5101 | XY800 |
| N16-S062603-6702 | XV800, 801,802, 803,804 |
| N16-S089739-6815 | L800 |
| N16-S089793-9196 | L801 |
| N16-T056175-0000 | V803 |
| N16-T056203-0050 | V802 |
| *N16-T075654-0000 | V800,801, 804 |
| N17-C073297-4370 | P800 |
| N17-S061164-7830 | S800 |
| N17-T067634-4626 | T803 |
| N17-T081979-5014 | T801 |
| N17-T082049-5270 | T802 |

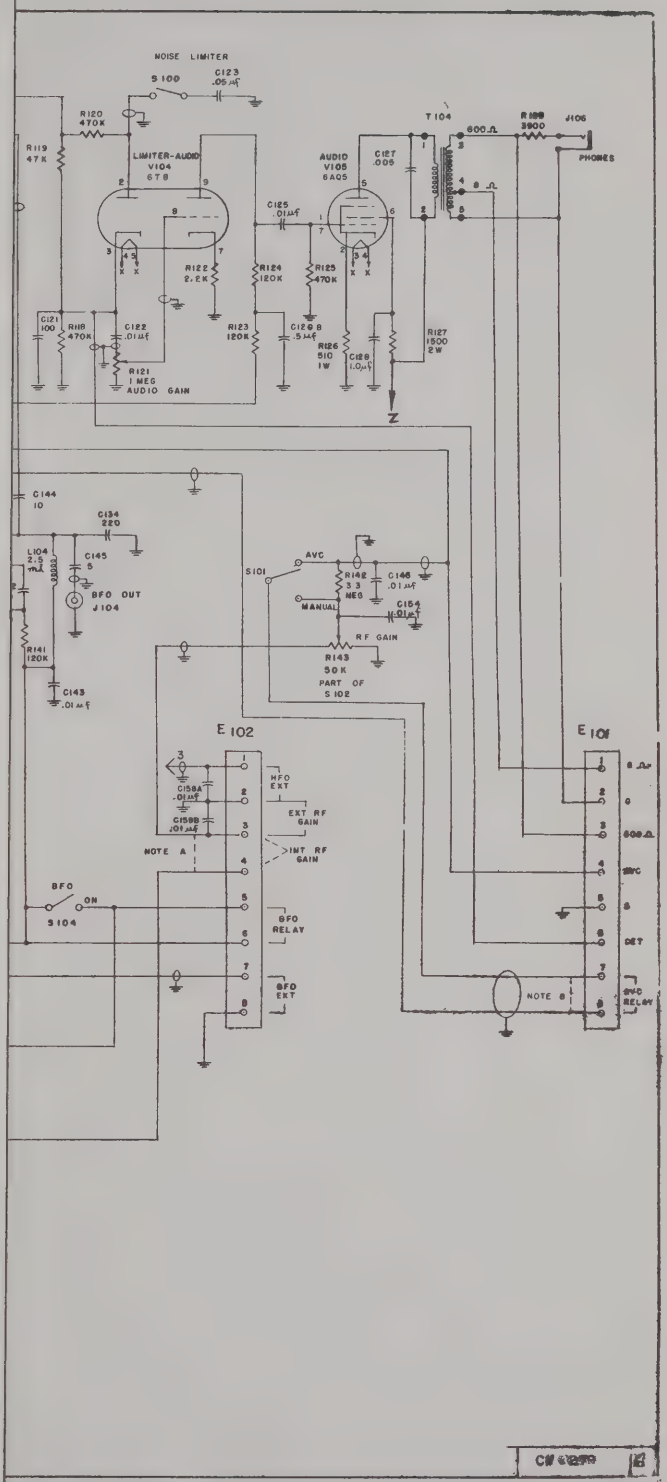
#Indicates: Low failure item - if required requisition from ESO referencing NAVSHIPS 900,180A.
*Indicates: "For replacement use SNSN-"

| STANDARD NAVY | REF. DESIG. |
|---|---|
| N17-T082128-4346 | T804 |
| N17-T082143-8005 | T800 |
| G.F.M. | Y800 |
| # | XI800 |
| CY-5045 A/FRR-502 | FFRDPH |
| G17-F016302-0082 | F1 |
| N17-C048215-1505 | W1 |
| N17-C073428-3259 | J1 |
| N17-C073583-3424 | J2,3 |

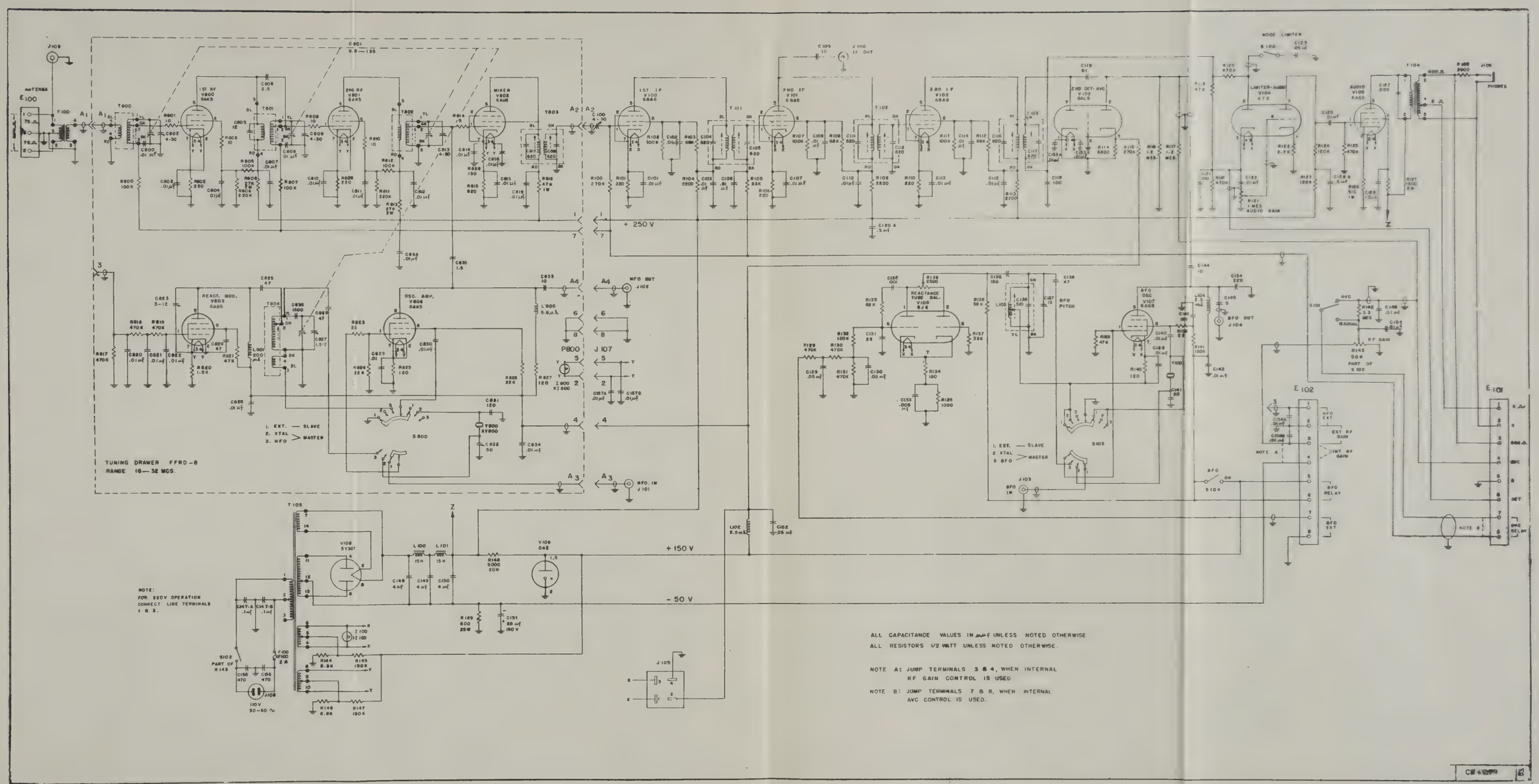
| STANDARD NAVY | REF. DESIG. |
|---|---|
| N17-F074266-9392 | XF1 |
| N17-S073082-9028 | S1 |
| N17-T070669-1049 | T1 |

| STANDARD NAVY | REF. DESIG. |
|---|---|

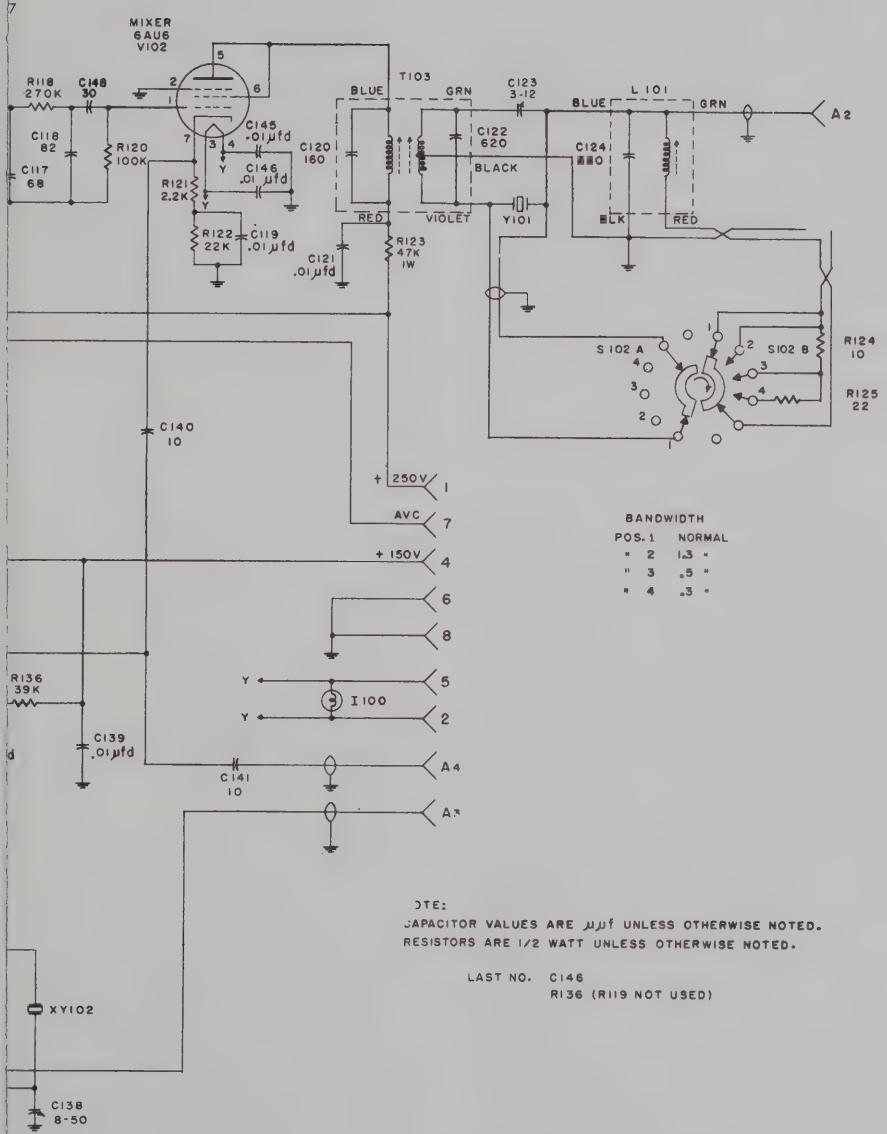
# Indicates: Low failure item - if required requisition from ESO referencing NAVSHIPS 900,180A.




SCHEMATIC DIAGRAM, MODEL FFR-2 AND FFRD-8




SCHEMATIC DIAGRAM, MODEL FFR-2 AND FFRD-8

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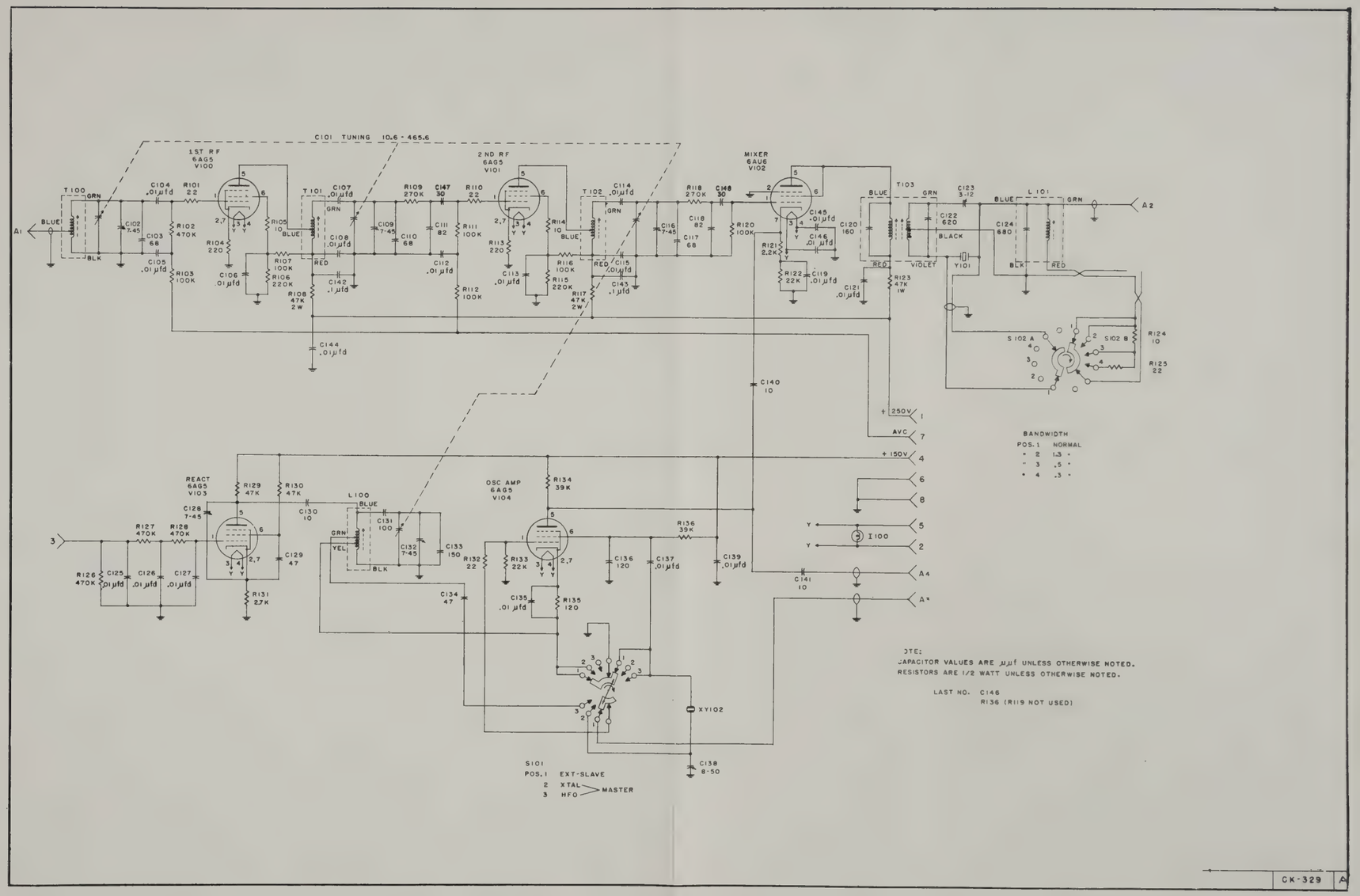
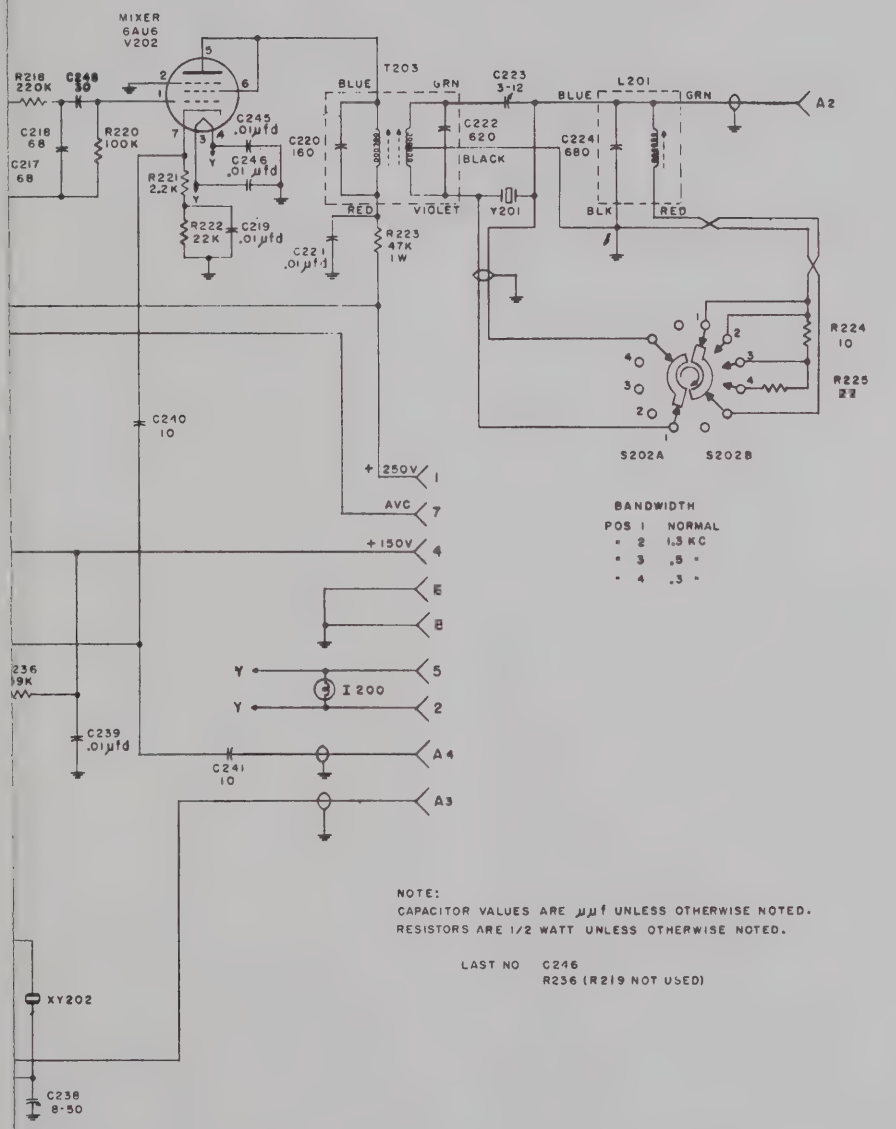
**Schematic Diagram, Model FFRD-1**




Schematic Diagram, Model FFRD-1

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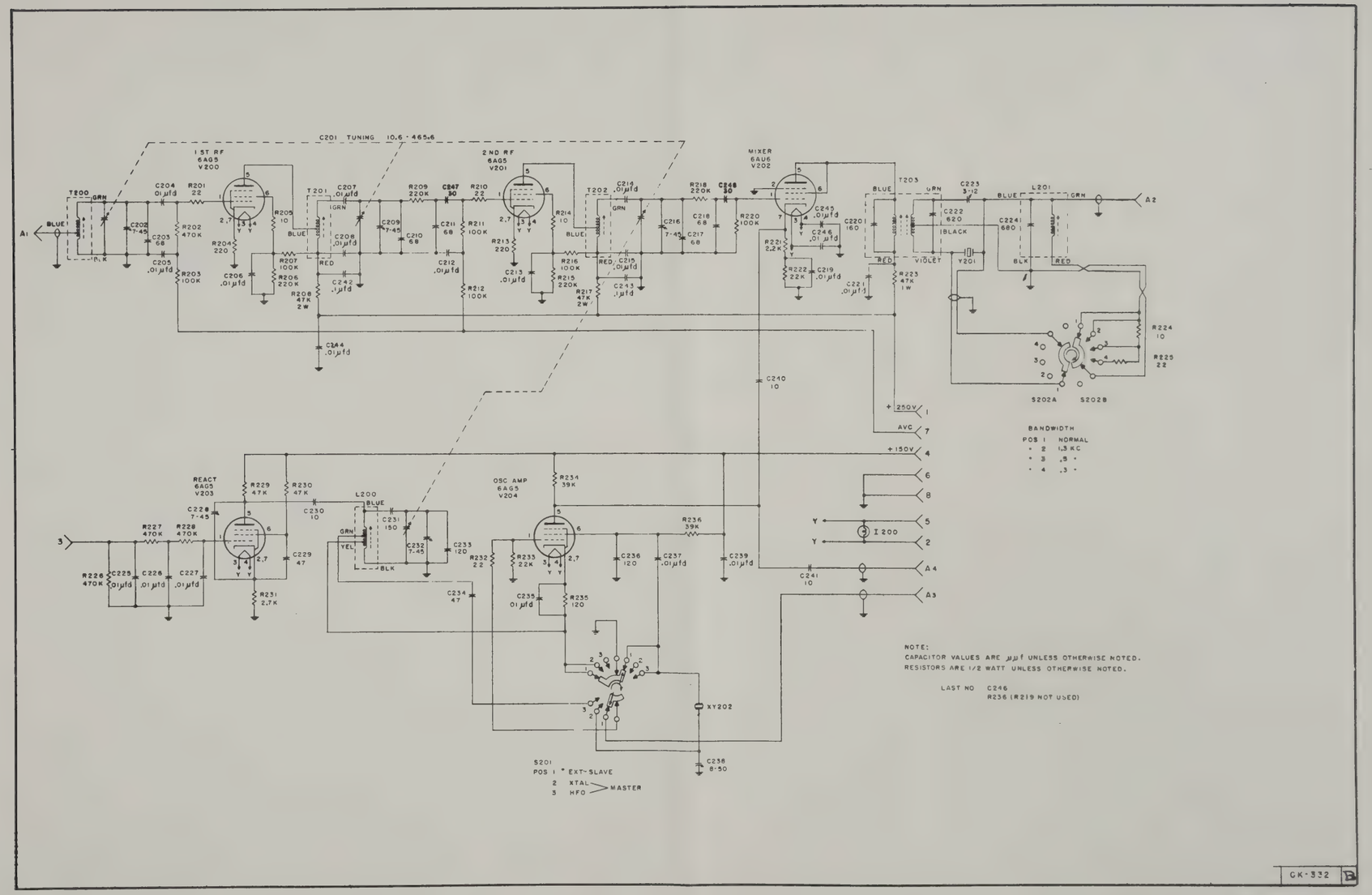
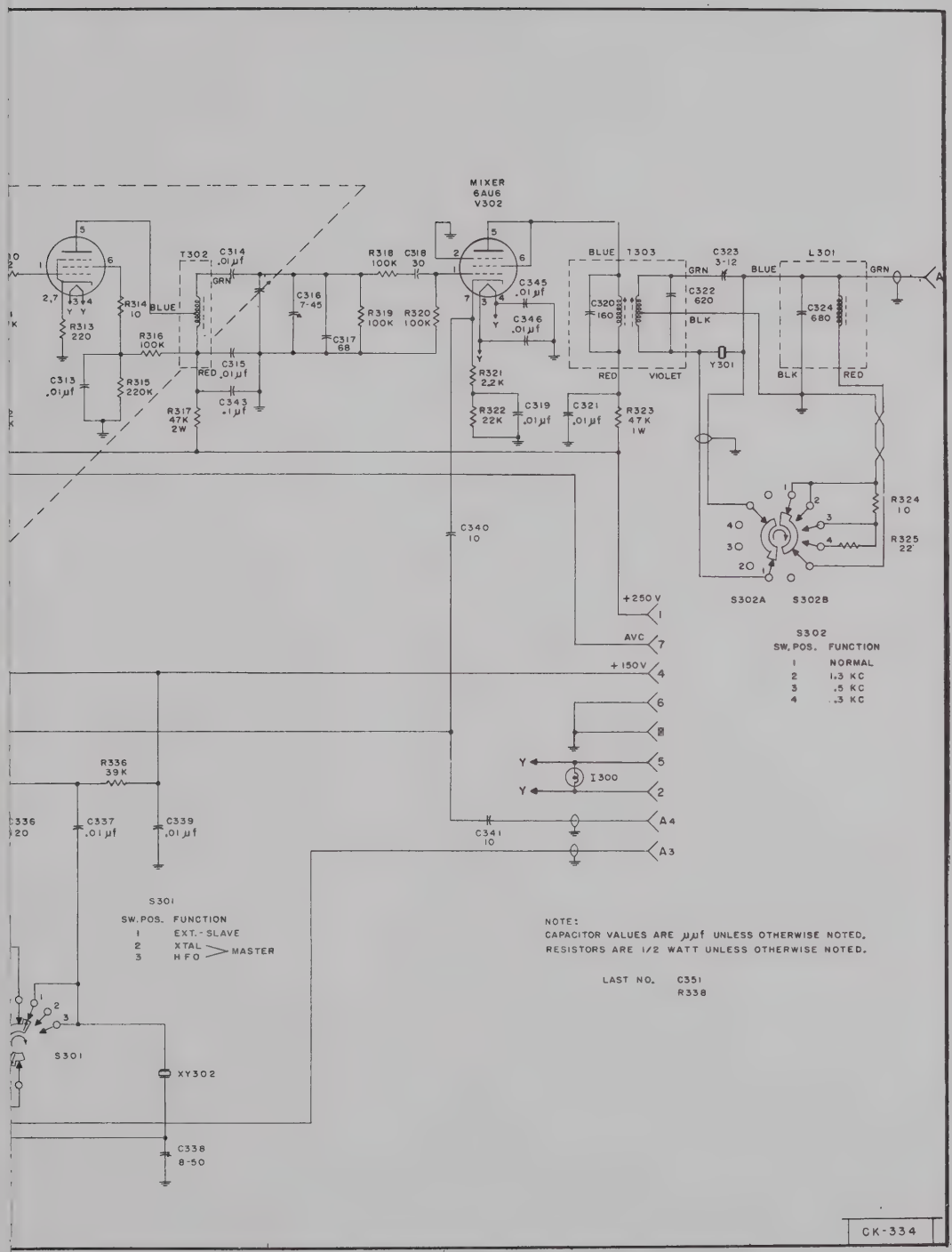
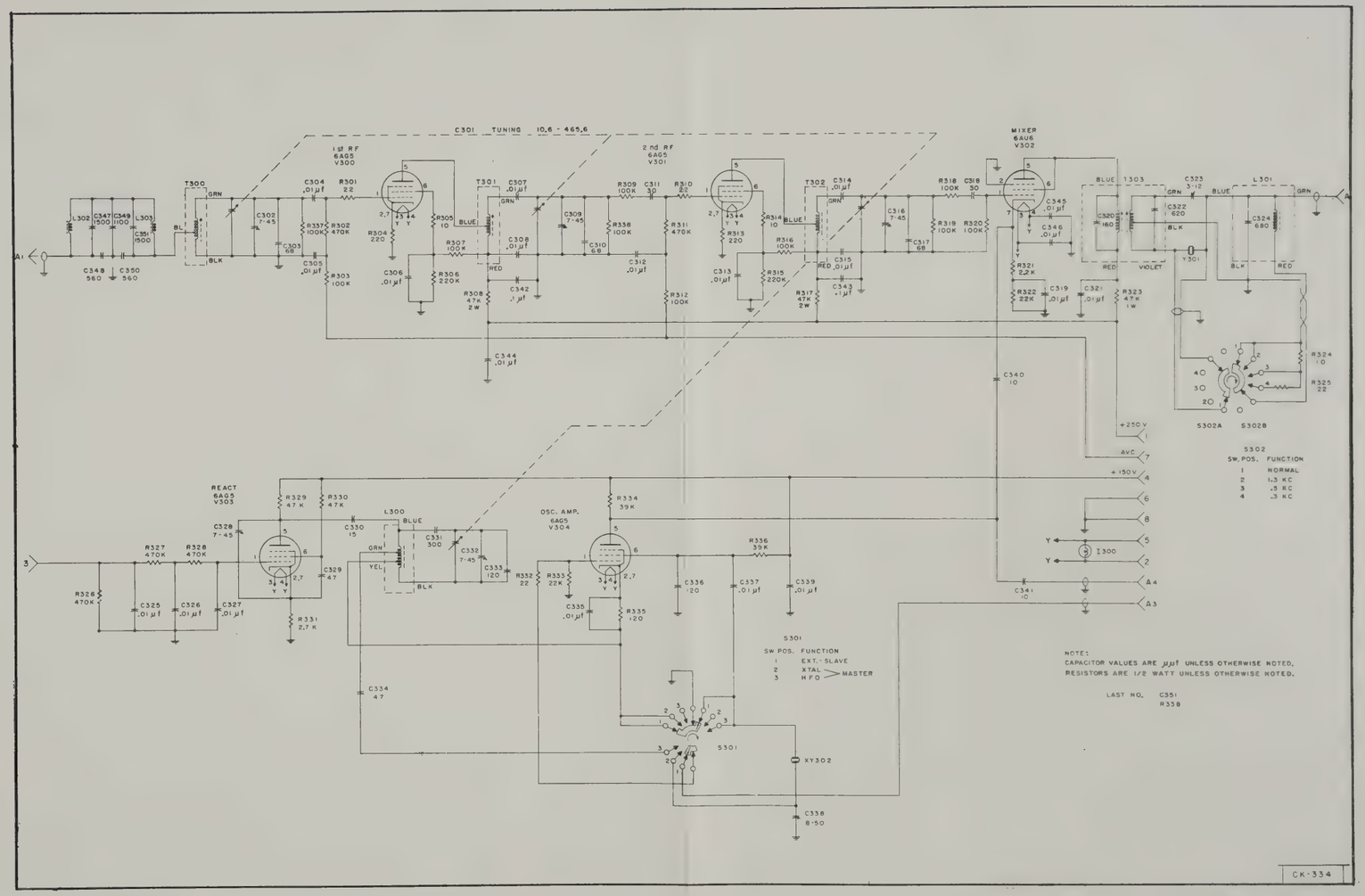
Schematic Diagram, Model FFRD-2



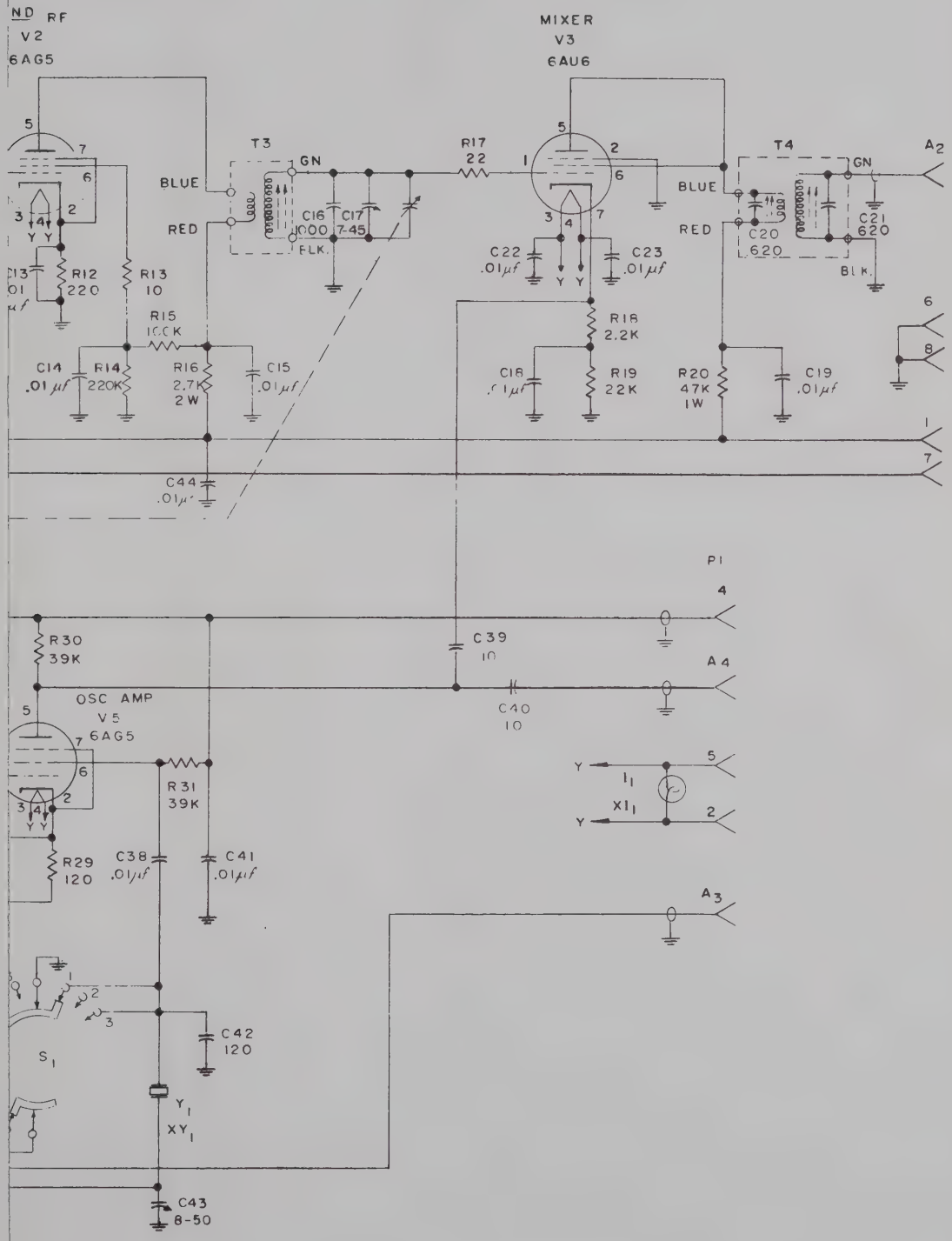

Schematic Diagram, Model FFRD-2




**Schematic Diagram, Model FFRD-3**

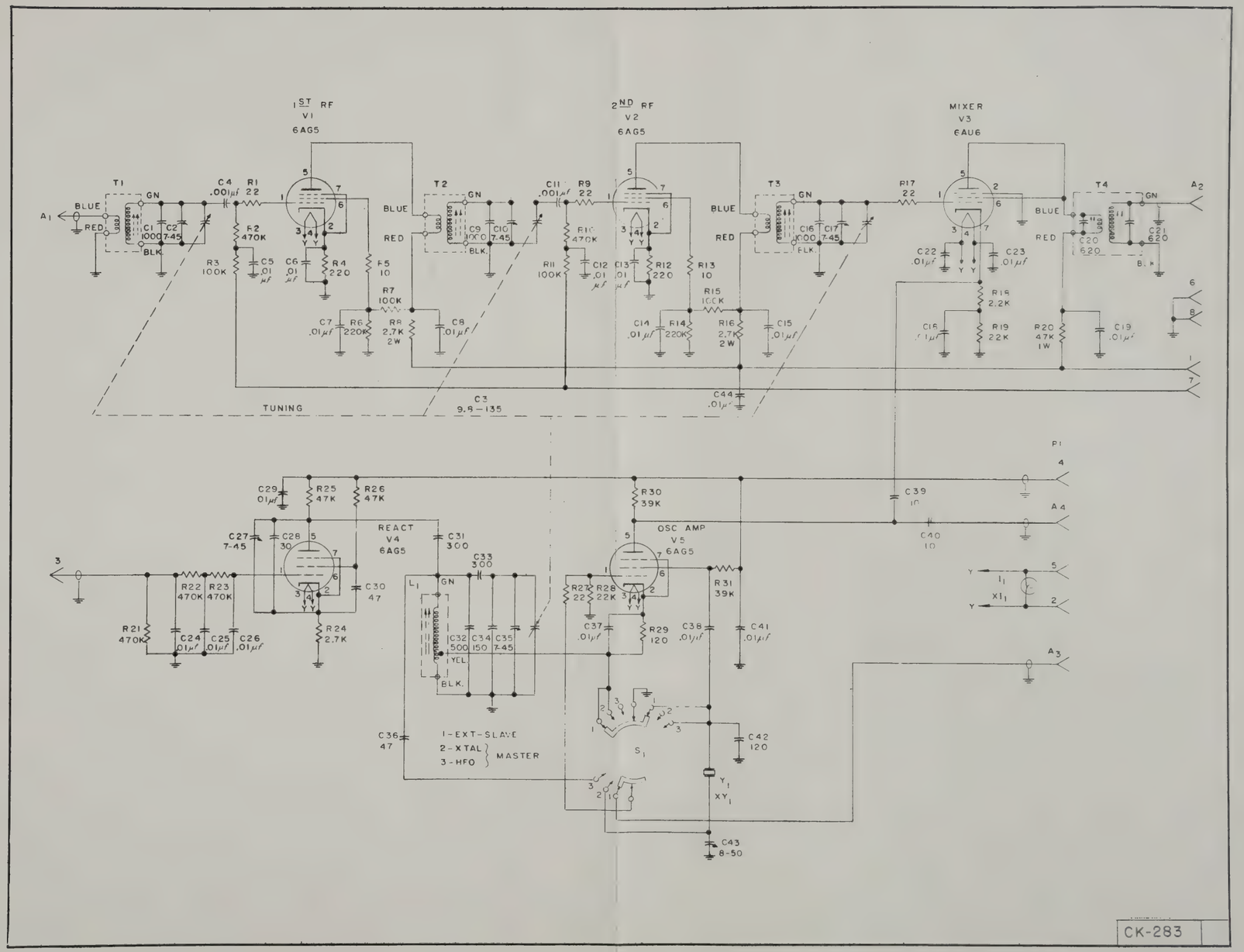



Schematic Diagram, Model FFRD-3

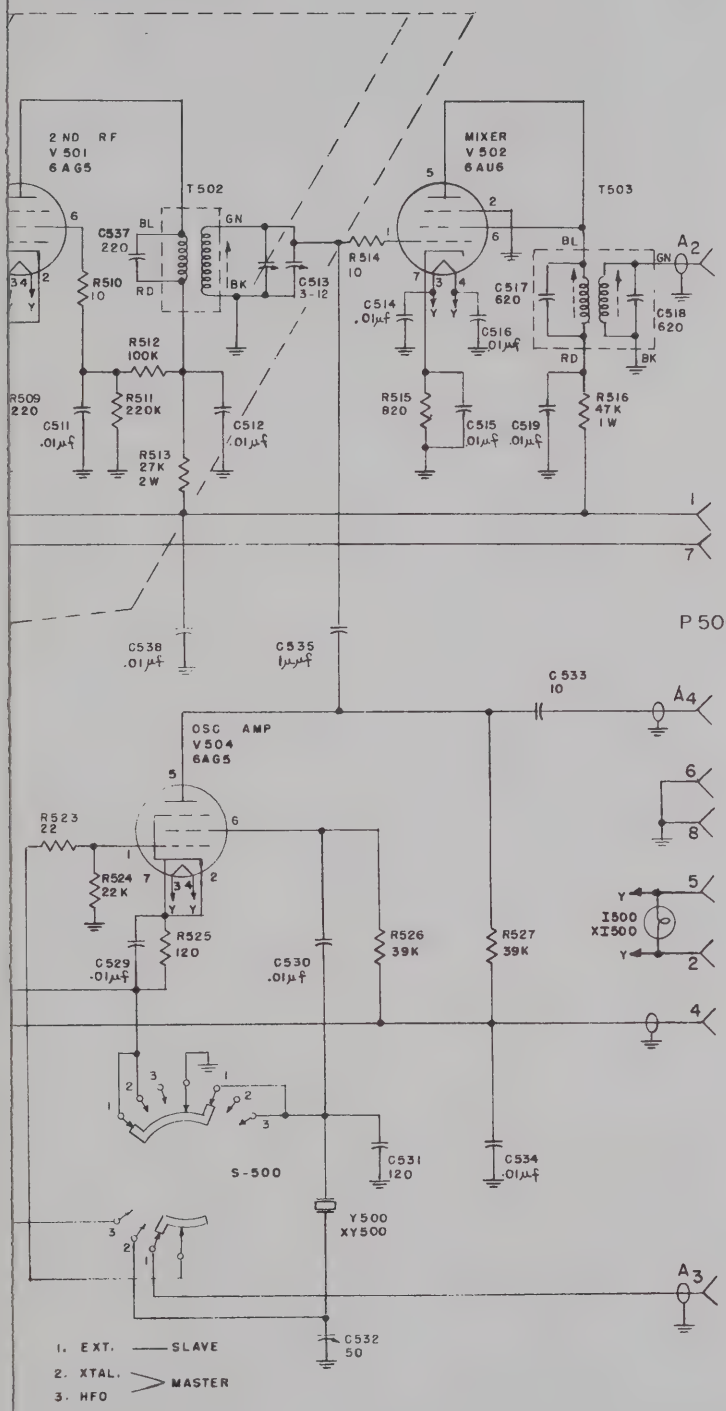



CK-283

Schematic Diagram, Model FFRD-3M

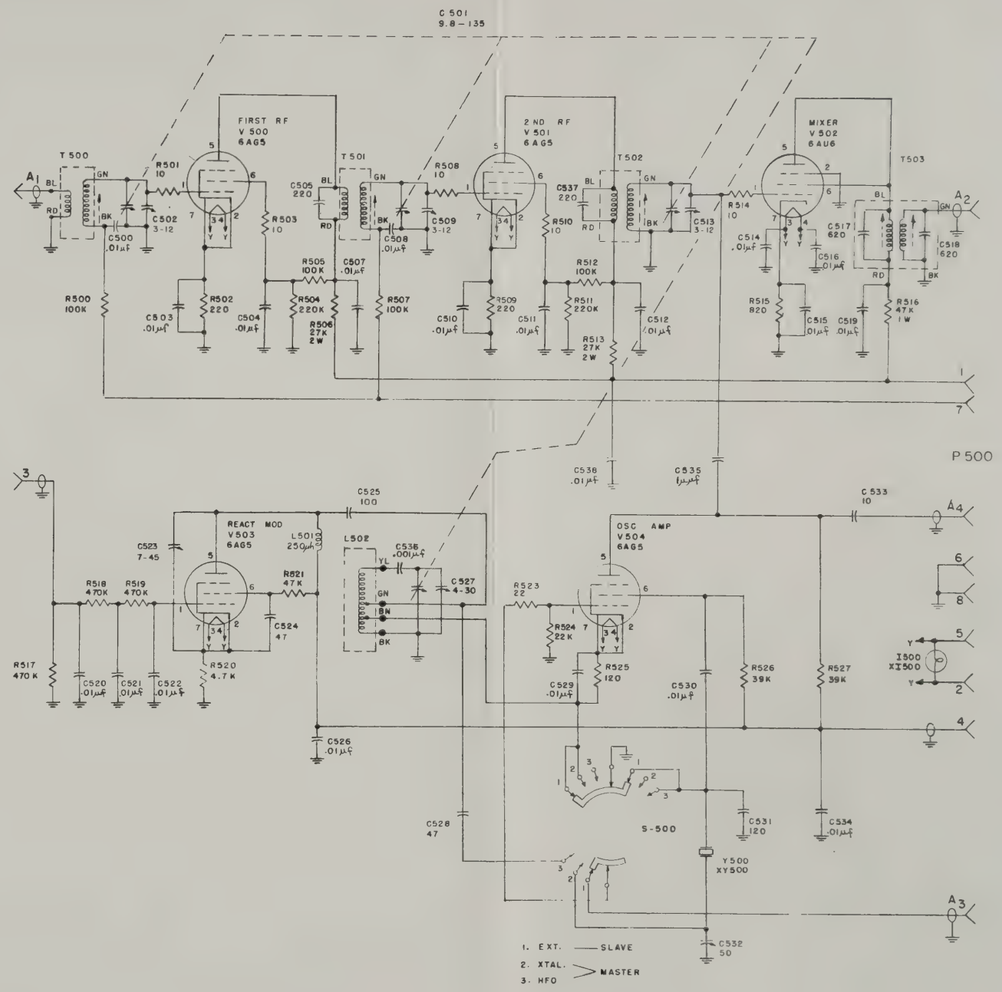



Schematic Diagram, Model FFRD-3M



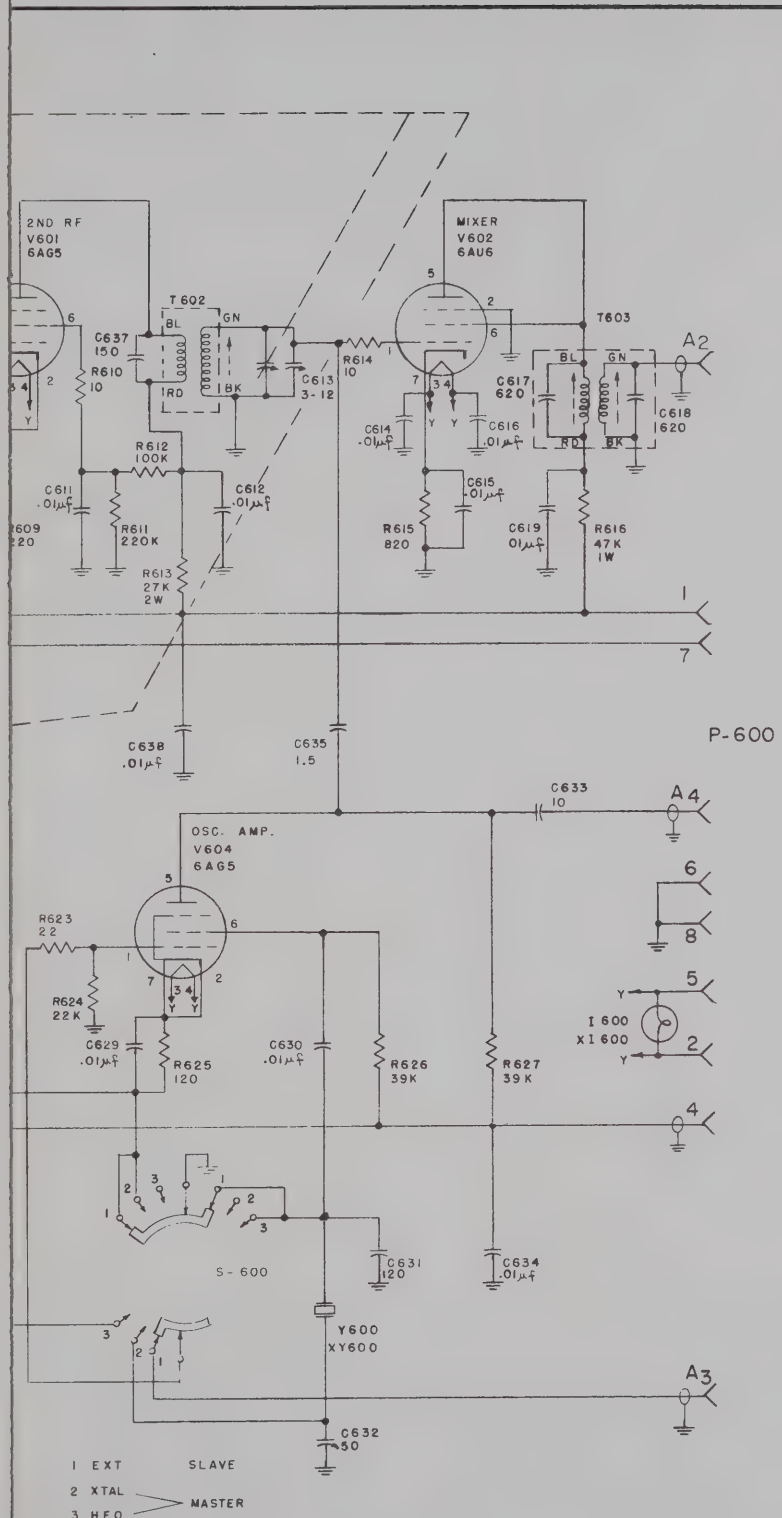

CK-124 | G

Schematic Diagram for FFRD-5



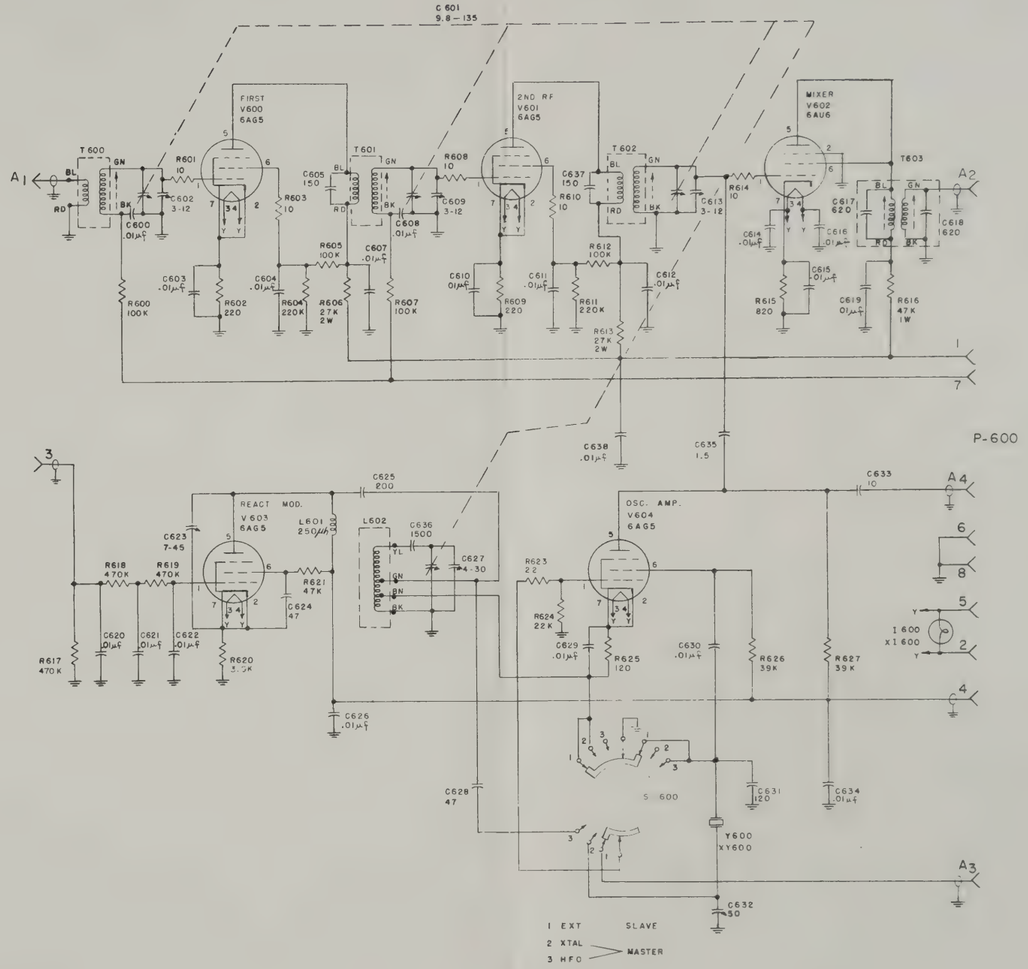

CK-124 G

Schematic Diagram for FFRD-5



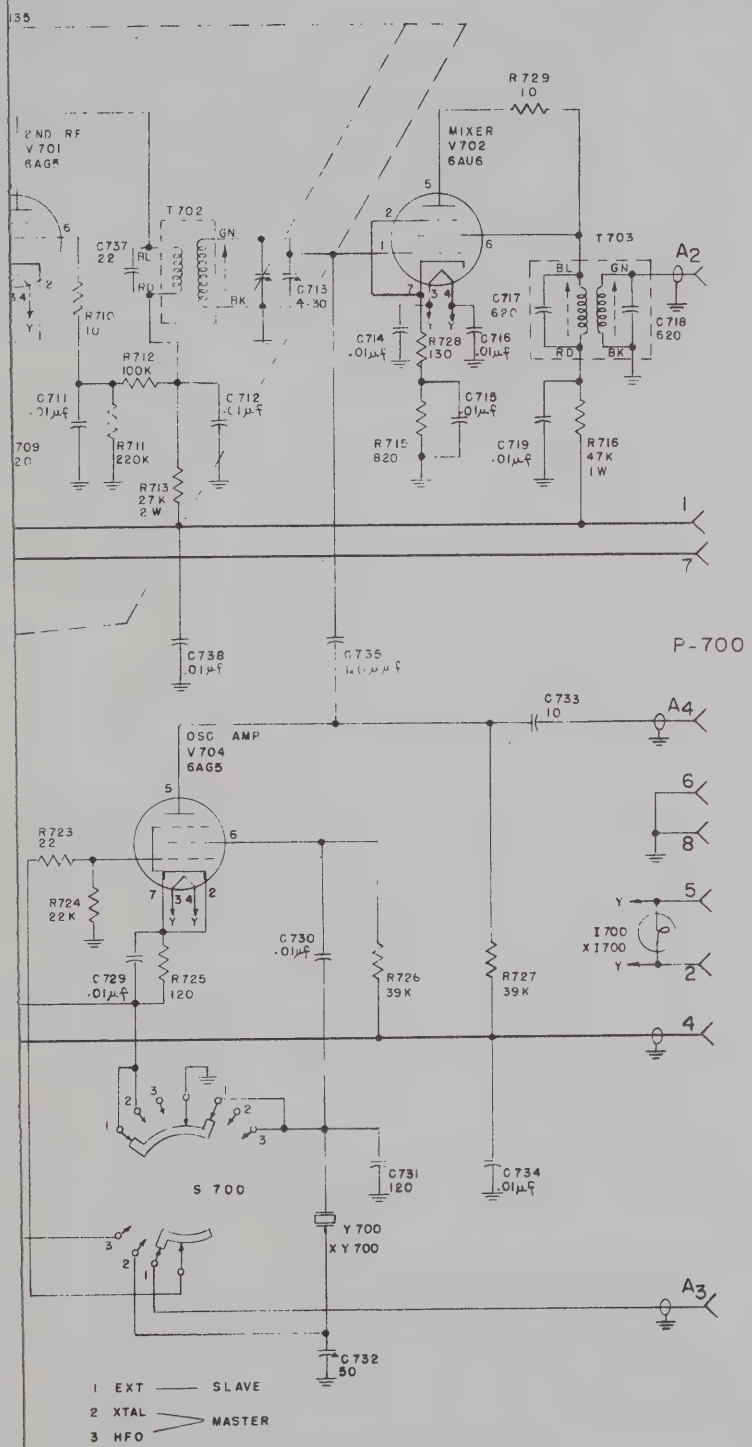

CK-133 | F

Schematic Diagram for FFRD-6



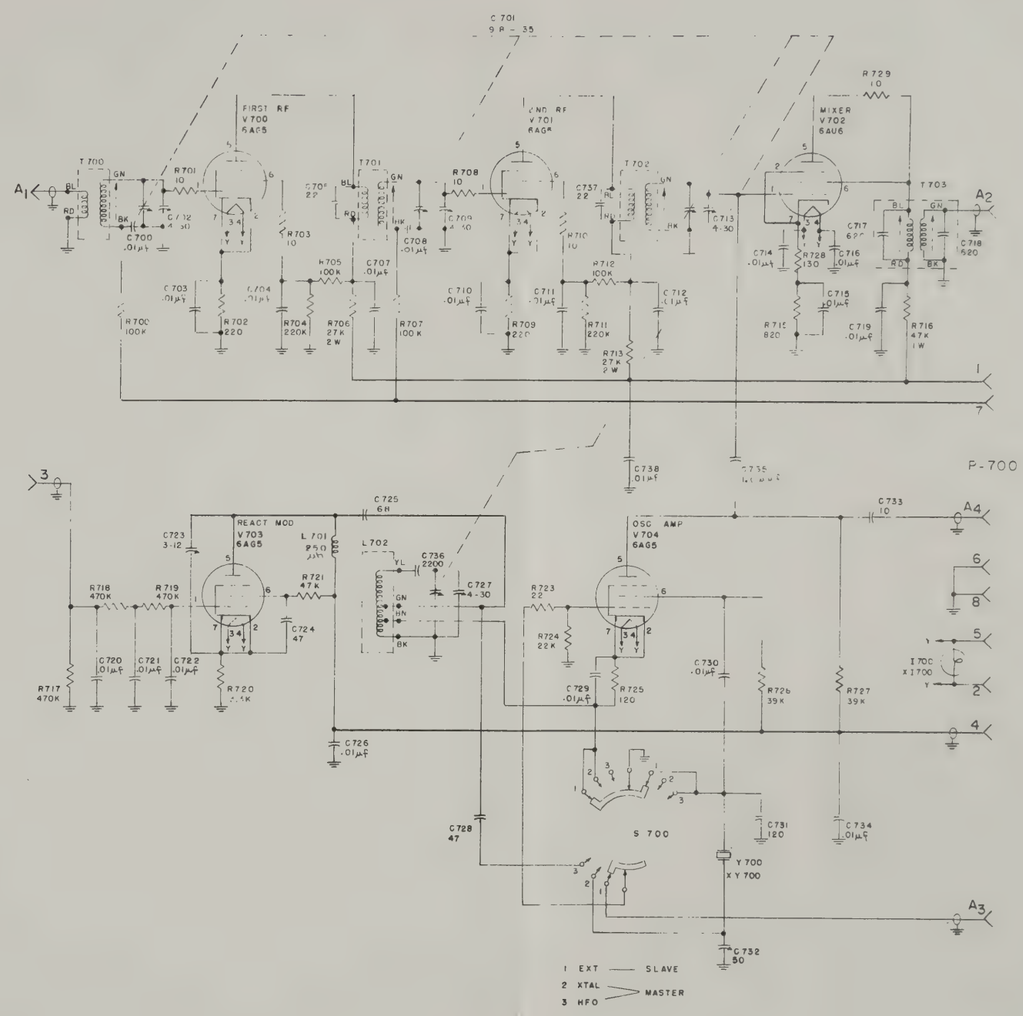

CK–133 F

Schematic Diagram for FFRD-6




CK--134 H

Schematic Diagram for FFRD-7




CK--134 | H

Schematic Diagram for FFRD-7